

Compliance 4 Buildings Ltd

ENERGY STATEMENT

Technical Report Number: 202422051M2051C/2

Our Reference: 202422051M2051C

Client: Signature Estates (NW) Ltd

Site: Unicorn House Cheetam Street Middleton M24 4DG

Prepared by: Aharon Horwich

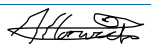
Tel: 0203 556 2407

Email: info@compliance4buildings.co.uk

Date of Issue: 2nd October 2024

Title:	Energy Statement
Project:	Energy Statement at Unicorn House
Our Reference:	202422051M2051C
Technical Report Number:	202422051M2051C/2
Site Address:	Unicorn House Cheetam Street Middleton M24 4DG
Client:	Signature Estates (NW) Ltd
Client Address:	263 Moorside Road
Submitted To:	Shailin Raghvani
Submitted By:	Aharon Horwich
Date:	2nd October 2024

QA CONTROL:

	NAME	POSITION	SIGNATURE	DATE
Prepared By	Aharon Horwich	Consultant		2nd October 2024
Approved By	Aharon Horwich	Consultant		2nd October 2024

REVISION HISTORY:

REVISION	DESCRIPTION	DATE	PREPARED	APPROVED
Final	Final	2nd October 2024	Aharon Horwich	Aharon Horwich

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TABLE OF CONTENTS.

1.0 Introduction 5

2.0 Baseline Energy Performance 6

3.0 Proposed Energy Performance and Key Upgrades 7

4.0 Tackling Fuel Poverty and Supporting Residents in the Cost-Of-Living Crisis 7

5.0 Financial and Long-Term Benefits 9

6.0 Conclusion 11

7.0 Appendix 12

APPENDICES

APPENDIX 1: SAP Calculations 12

1.0 INTRODUCTION

This Energy Statement has been prepared for the proposed development at Unicorn House, Cheetham St, Middleton, Manchester M24 4DG, which involves a change of use to 11 apartments (Class C3). The development's primary focus is to improve the energy efficiency of the apartments, directly addressing concerns related to fuel poverty and providing financial relief in the current cost of living crisis.

With rising energy prices and the increasing financial burden on households, enhancing the energy performance of homes has never been more critical. This statement outlines how the proposed development achieves substantial improvements in EPC ratings, thereby helping future residents reduce energy costs and avoid fuel poverty.

2.0 BASELINE ENERGY PERFORMANCE

The baseline energy performance of the apartments relies on electric heating, which is typically more expensive to run than alternative heating systems like gas. In the baseline scenario, many apartments fall within F, E, and D EPC bands, indicating poor energy efficiency. This can lead to higher energy bills and leave occupants vulnerable to fuel poverty, particularly during colder months when heating demand is higher.

3.0 PROPOSED ENERGY PERFORMANCE AND KEY UPGRADES

To improve the energy efficiency of the apartments and reduce the financial burden on occupants, the development incorporates several upgrades:

- Installation of gas combi boilers, replacing the less efficient electric heating.
- Improvements in air-tightness and upgraded glazing to reduce heat loss and improve thermal comfort.

These upgrades are designed to elevate the energy performance of the apartments into higher EPC bands, significantly lowering energy consumption and associated costs.

The table below compares the baseline and proposed EPC ratings, illustrating the improvements across the development:

	Baseline		**Improvement**	
Apartment	SAP Rating	EPC Band	SAP Rating	EPC Band
1	32	(F)	77	(C)
2	37	(F)	77	(C)
3	43	(E)	78	(C)
4	48	(E)	81	(B)
5	45	(E)	78	(C)
6	43	(E)	78	(C)
7	51	(E)	80	(C)
8	46	(E)	79	(C)
9	48	(E)	79	(C)
10	57	(D)	82	(B)
11	57	(D)	82	(B)

4.0 TACKLING FUEL POVERTY AND SUPPORTING RESIDENTS IN THE COST-OF-LIVING CRISIS

Improving energy efficiency through higher EPC ratings directly addresses the issue of fuel poverty, where households spend a disproportionate amount of their income on energy bills. As energy prices rise, it is vital to ensure that homes are designed or upgraded to minimize energy consumption. By increasing the EPC ratings of the apartments, this development ensures lower energy usage, which translates into reduced energy bills for residents.

The shift from F, E, and D ratings to C and B ratings represents a substantial improvement in energy performance, meaning that future occupants will benefit from homes that are cheaper to heat and maintain. These improvements come at a crucial time, as many households are struggling with rising energy costs due to the ongoing cost of living crisis.

By reducing the energy demand of each apartment, this development makes living in the apartments more affordable and sustainable, particularly for lower-income households who are most vulnerable to the impacts of fuel poverty. Additionally, better EPC ratings may protect residents from future energy price hikes, providing greater stability and financial security.

5.0 FINANCIAL AND LONG-TERM BENEFITS

The proposed improvements not only enhance the energy efficiency of the apartments but also contribute to the long-term financial well-being of residents. Lower energy consumption means reduced heating costs, providing immediate relief from high utility bills.

The table below demonstrates the predicted reduction in running costs between the baseline and improved scenarios for each apartment:

	Baseline			Improvement			
Apartment	SAP Rating	EPC Band	Estimated Energy Usage (£)	SAP Rating	EPC Band	Estimated Energy Usage (£)	Reduction in running costs
1	32	(F)	£ 2,261	77	(C)	£ 683	69.8%
2	37	(F)	£ 1,712	77	(C)	£ 564	67.1%
3	43	(E)	£ 1,461	78	(C)	£ 518	64.5%
4	48	(E)	£ 1,361	81	(B)	£ 458	66.3%
5	45	(E)	£ 1,562	78	(C)	£ 570	63.5%
6	43	(E)	£ 1,488	78	(C)	£ 526	64.7%
7	51	(E)	£ 1,240	80	(C)	£ 465	62.5%
8	46	(E)	£ 1,576	79	(C)	£ 575	63.5%
9	48	(E)	£ 1,458	79	(C)	£ 528	63.8%
10	57	(D)	£ 1,278	82	(B)	£ 486	62.0%
11	57	(D)	£ 1,136	82	(B)	£ 439	61.4%

In the context of the cost-of-living crisis, these benefits are especially important. The improvements deliver energy savings of up to 70%, which provides substantial relief from high utility bills. The upgrade from F/E/D to C/B EPC ratings ensures that residents will be insulated from the financial stress of rising energy prices, offering a more stable and affordable living environment.

Additionally, higher EPC ratings may increase the future resale or rental value of the apartments, making them more attractive to prospective buyers and tenants. These improvements ensure that the apartments are not only energy-efficient but also financially beneficial for residents in the long term.

6.0 CONCLUSION

The proposed development at Unicorn House demonstrates a commitment to tackling fuel poverty and supporting residents during the cost-of-living crisis. By improving EPC ratings and lowering energy consumption, the development offers significant financial benefits for future occupants through reduced energy bills and greater protection against rising energy costs.

This focus on energy efficiency ensures that the apartments are not only environmentally sustainable but also affordable and resilient in the face of ongoing economic challenges. By prioritizing these upgrades, the development supports the well-being of its future residents and contributes to a more sustainable and equitable housing sector.

7.0 APPENDIX

APPENDIX 1: SAP CALCULATIONS

Summary for Input Data

elmhurst energy

Property Reference	Apt. 1	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 1	**Prop Type Ref**	
Property			

SAP Rating	32 F	**DER**	17.40	**TER**	
Environmental	85 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.31	**DFEE**	96.83	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	179.74	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southeast	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	38.05 m	79.24 m²	3.10 m

8.0 Living Area	26.12	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	56.02	47.98	0.00	None	8.04	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	61.94	59.84	0.00	None	2.10	Enter Gross Area

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	79.24

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Other	0.25	None	0.00	0.00	79.24

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NE1	New Glazing	External Wall 1	North East	5.36	0

Summary for Input Data

elmhurst energy

W NE2	Existing Glazing	External Wall 1	North East	2.68	0
D SE	New Door	Corridor Wall	South East	2.10	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	
SAP Code	903	
Fuel Type	Electricity	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	

Summary for Input Data

elmhurst energy

Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	
34.0 Small-scale Hydro	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 1	Issued on Date	01/10/2024
Assessment Reference	Apt. 1	Prop Type Ref	
Property			

SAP Rating	32 F	DER	17.40	TER	
Environmental	85 B	% DER < TER			N/A
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Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	179.74	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		245.6440	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8314 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9010	0.8834	0.8657	0.7774	0.7597	0.6714	0.6714	0.6537	0.7067	0.7597	0.7950	0.8304	(22b)
Effective ac	0.9059	0.8902	0.8747	0.8022	0.7886	0.7254	0.7254	0.7137	0.7497	0.7886	0.8160	0.8448	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			2.6800	2.7580	7.3915			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Corridor Wall	61.9400	2.1000	59.8400	0.1800	10.7712			(29a)
Total net area of external elements Aum(A, m2)			197.2000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	62.4127			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.4400 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	101.8527 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	73.4382	72.1604	70.9079	65.0249	63.9242	58.8003	58.8003	57.8514	60.7739	63.9242	66.1509	68.4788	(38)
Heat transfer coeff	175.2909	174.0131	172.7606	166.8776	165.7769	160.6530	160.6530	159.7041	162.6266	165.7769	168.0036	170.3315	(39)

Average = Sum(39)m / 12 = 166.8723

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2122	2.1960	2.1802	2.1060	2.0921	2.0274	2.0274	2.0154	2.0523	2.0921	2.1202	2.1496	(40)
HLP (average)												2.1059	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4483 (42)

Hot water usage for mixer showers

73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)

Average daily hot water use (litres/day) 103.7251 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)
Energy content (annual)										Total = Sum(45)m =		1723.0069	
Distribution loss (46)m = 0.15 x (45)m	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)
										Total per year (kWh/year) = Sum(64)m =		1985.8069	(64)
12Total per year (kWh/year)												1986	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	77.3925	68.4530	72.7736	64.1381	62.2736	56.2268	55.5847	57.7337	58.3016	64.8760	68.8167	76.5696	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.0390	137.3289	124.0390	128.1736	124.0390	128.1736	124.0390	124.0390	128.1736	124.0390	128.1736	124.0390	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	217.8448	220.1054	214.4089	202.2817	186.9733	172.5855	162.9736	160.7131	166.4096	178.5368	193.8452	208.2329	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)	104.0222	101.8645	97.8139	89.0807	83.7011	78.0927	74.7106	77.5991	80.9745	87.1989	95.5787	102.9162	(72)
Total internal gains	505.6302	519.0230	495.9860	479.2602	454.4376	438.5761	421.4474	422.0754	435.2820	449.4989	477.3218	494.9123	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northeast	2.6800	11.2829	0.7600	0.7000	0.7700	11.1481	(75)

Solar gains	36.6296	74.5605	134.3344	220.6156	296.5507	316.1545	295.7560	235.7801	163.6885	91.1189	46.0895	29.9135	(83)
Total gains	542.2598	593.5835	630.3204	699.8759	750.9883	754.7306	717.2034	657.8555	598.9705	540.6178	523.4112	524.8259	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	31.3923	31.6228	31.8520	32.9749	33.1939	34.2526	34.2526	34.4561	33.8369	33.1939	32.7539	32.3063	
alpha	3.0928	3.1082	3.1235	3.1983	3.2129	3.2835	3.2835	3.2971	3.2558	3.2129	3.1836	3.1538	
util living area	0.9956	0.9937	0.9899	0.9777	0.9466	0.8687	0.7610	0.8077	0.9351	0.9833	0.9933	0.9961	(86)
MIT	18.2937	18.4867	18.8573	19.4619	20.0406	20.5655	20.8121	20.7624	20.3470	19.6231	18.9130	18.3234	(87)
Th 2	19.1956	19.2059	19.2159	19.2636	19.2726	19.3151	19.3151	19.3231	19.2987	19.2726	19.2544	19.2355	(88)
util rest of house	0.9939	0.9911	0.9855	0.9663	0.9129	0.7679	0.5553	0.6234	0.8766	0.9726	0.9902	0.9946	(89)

MIT 2	16.1817	16.4339	16.9129	17.7065	18.4284	19.0488	19.2584	19.2380	18.8210	17.9215	17.0066	16.2411	(90)
Living area fraction										fLA = Living area / (4) =		0.3296	(91)
MIT	16.8779	17.1105	17.5538	18.2851	18.9598	19.5488	19.7705	19.7405	19.3240	18.4824	17.6350	16.9275	(92)
Temperature adjustment												0.0000	
adjusted MIT	16.8779	17.1105	17.5538	18.2851	18.9598	19.5488	19.7705	19.7405	19.3240	18.4824	17.6350	16.9275	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9901	0.9862	0.9788	0.9564	0.9042	0.7861	0.6232	0.6815	0.8779	0.9647	0.9853	0.9913	(94)
Useful gains	536.9020	585.4160	616.9395	669.3945	679.0743	593.2765	446.9640	448.3464	525.8221	521.5552	515.7416	520.2755	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	2204.7862	2124.7942	1909.6654	1566.1677	1203.5132	795.0352	509.3565	533.4894	849.5692	1306.7186	1769.9212	2167.8914	(97)
Space heating kWh	1240.9058	1034.4621	961.7880	645.6767	390.1825	0.0000	0.0000	0.0000	0.0000	584.1615	903.0093	1225.8263	(98a)
Space heating requirement - total per year (kWh/year)												6986.0124	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	1240.9058	1034.4621	961.7880	645.6767	390.1825	0.0000	0.0000	0.0000	0.0000	584.1615	903.0093	1225.8263	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6986.0124	
Space heating per m2											(98c) / (4) =	88.1627	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1240.9058	1034.4621	961.7880	645.6767	390.1825	0.0000	0.0000	0.0000	0.0000	584.1615	903.0093	1225.8263	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	1240.9058	1034.4621	961.7880	645.6767	390.1825	0.0000	0.0000	0.0000	0.0000	584.1615	903.0093	1225.8263	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.6901	16.5984	14.9450	10.9493	8.4576	6.9099	7.7153	10.0286	13.0262	17.0911	19.3043	21.2651	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	6986.0124	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1985.8069	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	166.9809	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	9138.8002	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6986.0124	0.1538	1074.3811	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	1985.8069	0.1412	280.4301	(264)
Space and water heating			1354.8112	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	166.9809	0.1443	24.1005	(268)
Total CO2, kg/year			1378.9117	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			17.4000	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	6986.0124	1.5694	10963.6925	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1985.8069	1.5222	3022.7665	(278)
Space and water heating			13986.4591	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	166.9809	1.5338	256.1209	(282)
Total Primary energy kWh/year			14242.5800	(286)
Dwelling Primary energy Rate (DPER)			179.7400	(287)

Full SAP Calculation Printout

Property Reference	Apt. 1	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 1	**Prop Type Ref**	
Property			

SAP Rating	32 F	**DER**	17.40	**TER**	
Environmental	85 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.31	**DFEE**	96.83	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	179.74	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		245.6440	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	3 * 10 =	30.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1221 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8721 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7413 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9452	0.9266	0.9081	0.8154	0.7969	0.7042	0.7042	0.6857	0.7413	0.7969	0.8340	0.8710	(22b)

If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)	0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =	0.0000 (23c)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Effective ac	0.9467	0.9293	0.9123	0.8325	0.8175	0.7480	0.7480	0.7351	0.7748	0.8175	0.8478	0.8794	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			2.6800	2.7580	7.3915			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Corridor Wall	61.9400	2.1000	59.8400	0.1800	10.7712			(29a)
Total net area of external elements Aum(A, m2)			197.2000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		62.4127			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)	39.4400 (36)
Point Thermal bridges (36a) =	0.0000
Total fabric heat loss (33) + (36) + (36a) =	101.8527 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	76.7396	75.3336	73.9554	67.4822	66.2711	60.6331	60.6331	59.5890	62.8048	66.2711	68.7211	71.2826	(38)

Heat transfer coeff

	178.5923	177.1863	175.8081	169.3349	168.1238	162.4858	162.4858	161.4417	164.6575	168.1238	170.5739	173.1353 (39)
Average = Sum(39)m / 12 =												169.3291

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2538	2.2361	2.2187	2.1370	2.1217	2.0506	2.0506	2.0374	2.0780	2.1217	2.1526	2.1849	(40)
HLP (average)												2.1369	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4483 (42)

Hot water usage for mixer showers

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)

Hot water usage for baths

	28.1912	27.7725	27.1829	26.0958	25.2818	24.3792	23.8917	24.4771	25.1146	26.0804	27.1899	28.0959 (42b)

Hot water usage for other uses

	39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029 (42c)

Average daily hot water use (litres/day) 62.2312 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	67.8940	66.0316	63.9983	61.4675	59.2097	56.8634	56.3758	58.4050	60.4862	62.8958	65.4490	67.7987	(44)
Energy conte	107.5276	94.0282	98.3630	84.1459	79.7077	69.9202	68.1817	72.3176	74.5856	85.3490	93.2441	106.1564	(45)
Energy content (annual)										Total = Sum(45)m =		1033.5269	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	91.3984	79.9239	83.6086	71.5240	67.7515	59.4321	57.9544	61.4700	63.3978	72.5467	79.2575	90.2330	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	91.3984	79.9239	83.6086	71.5240	67.7515	59.4321	57.9544	61.4700	63.3978	72.5467	79.2575	90.2330	(64)
										Total per year (kWh/year) = Sum(64)m =		878.4979	(64)
12Total per year (kWh/year)												878	(64)
Electric shower(s)													
	52.2699	46.5729	50.8558	48.5311	49.4417	47.1626	48.7347	49.4417	48.5311	50.8558	49.8995	52.2699	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		594.5668	(64a)
Heat gains from water heating, kWh/month													
	35.9171	31.6242	33.6161	30.0138	29.2983	26.6487	26.6723	27.7279	27.9822	30.8506	32.2893	35.6257	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	124.0390	137.3289	124.0390	128.1736	124.0390	128.1736	124.0390	124.0390	128.1736	124.0390	128.1736	124.0390	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	217.8448	220.1054	214.4089	202.2817	186.9733	172.5855	162.9736	160.7131	166.4096	178.5368	193.8452	208.2329	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)													
	48.2756	47.0598	45.1829	41.6858	39.3795	37.0121	35.8499	37.2687	38.8642	41.4659	44.8462	47.8840	(72)
Total internal gains													
	449.8837	464.2183	443.3550	431.8653	410.1159	397.4955	382.5867	381.7450	393.1716	403.7659	426.5892	439.8802	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northeast	2.6800	11.2829	0.7600	0.7000	0.7700	11.1481	(75)

Solar gains	36.6296	74.5605	134.3344	220.6156	296.5507	316.1545	295.7560	235.7801	163.6885	91.1189	46.0895	29.9135	(83)
Total gains	486.5132	538.7788	577.6894	652.4810	706.6667	713.6499	678.3427	617.5252	556.8602	494.8848	472.6787	469.7937	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	30.8119	31.0564	31.2999	32.4964	32.7305	33.8662	33.8662	34.0852	33.4195	32.7305	32.2604	31.7831	
alpha	3.0541	3.0704	3.0867	3.1664	3.1820	3.2577	3.2577	3.2723	3.2280	3.1820	3.1507	3.1189	
util living area													
	0.9967	0.9951	0.9921	0.9817	0.9546	0.8848	0.7848	0.8311	0.9463	0.9870	0.9950	0.9972	(86)
MIT	18.1868	18.3837	18.7623	19.3850	19.9782	20.5253	20.7878	20.7328	20.2951	19.5517	18.8258	18.2224	(87)
Th 2	19.1695	19.1806	19.1915	19.2436	19.2534	19.2998	19.2998	19.3085	19.2819	19.2534	19.2335	19.2129	(88)
util rest of house													
	0.9954	0.9932	0.9885	0.9720	0.9248	0.7904	0.5812	0.6526	0.8951	0.9784	0.9926	0.9960	(89)
MIT 2	16.7238	16.9272	17.3115	17.9624	18.5450	19.0678	19.2482	19.2310	18.8713	18.1378	17.4027	16.7869	(90)
Living area fraction										fLA = Living area / (4) =		0.3296	(91)

MIT	17.2061	17.4073	17.7897	18.4313	19.0174	19.5483	19.7557	19.7261	19.3406	18.6039	17.8718	17.2601	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.2061	17.4073	17.7897	18.4313	19.0174	19.5483	19.7557	19.7261	19.3406	18.6039	17.8718	17.2601	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9932	0.9901	0.9842	0.9654	0.9191	0.8085	0.6494	0.7099	0.8977	0.9734	0.9897	0.9941	(94)
Useful gains	483.1892	533.4577	568.5570	629.8732	649.5126	577.0150	440.5189	438.3669	499.8834	481.7114	467.7900	467.0202	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	2304.9263	2216.1223	1984.8248	1613.9843	1230.2328	804.0218	512.7623	536.9646	862.9088	1345.6407	1837.3909	2261.1648	(97)
Space heating kWh													
	1355.3724	1130.7506	1053.7032	708.5600	432.0559	0.0000	0.0000	0.0000	0.0000	642.7634	986.1127	1334.8436	(98a)
Space heating requirement - total per year (kWh/year)												7644.1618	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	1355.3724	1130.7506	1053.7032	708.5600	432.0559	0.0000	0.0000	0.0000	0.0000	642.7634	986.1127	1334.8436	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												7644.1618	
Space heating per m2											(98c) / (4) =	96.4685	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	1527.3666	1202.3950	1226.9572	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.4790	0.5583	0.5085	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	731.5336	671.3003	623.8627	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	776.0902	737.6135	669.0730	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	32.0807	49.3370	33.6364	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	8.0202	12.3343	8.4091	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												28.7636	(107)
Energy for space heating												96.4685	(99)
Energy for space cooling												0.3630	(108)
Total												96.8315	(109)
Fabric Energy Efficiency (DFEE)												96.8	(109)

Full SAP Calculation Printout

Property Reference	Apt. 1	Issued on Date	01/10/2024
Assessment Reference	Apt. 1	Prop Type Ref	
Property			

SAP Rating	32 F	DER	17.40	TER	
Environmental	85 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.31	DFEE	96.83	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	179.74	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		245.6440	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8314 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9010	0.8834	0.8657	0.7774	0.7597	0.6714	0.6714	0.6537	0.7067	0.7597	0.7950	0.8304	(22b)
Effective ac	0.9059	0.8902	0.8747	0.8022	0.7886	0.7254	0.7254	0.7137	0.7497	0.7886	0.8160	0.8448	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			2.6800	2.7580	7.3915			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Corridor Wall	61.9400	2.1000	59.8400	0.1800	10.7712			(29a)
Total net area of external elements Aum(A, m2)			197.2000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	62.4127			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.4400 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	101.8527 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	73.4382	72.1604	70.9079	65.0249	63.9242	58.8003	58.8003	57.8514	60.7739	63.9242	66.1509	68.4788	(38)
Heat transfer coeff	175.2909	174.0131	172.7606	166.8776	165.7769	160.6530	160.6530	159.7041	162.6266	165.7769	168.0036	170.3315	(39)

Average = Sum(39)m / 12 = 166.8723

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2122	2.1960	2.1802	2.1060	2.0921	2.0274	2.0274	2.0154	2.0523	2.0921	2.1202	2.1496	(40)
HLP (average)												2.1059	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4483 (42)

Hot water usage for mixer showers

73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)

Average daily hot water use (litres/day) 103.7251 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)
Energy content (annual)										Total = Sum(45)m =		1723.0069	
Distribution loss (46)m = 0.15 x (45)m	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)
										Total per year (kWh/year) = Sum(64)m =		1985.8069	(64)
12Total per year (kWh/year)												1986	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	77.3925	68.4530	72.7736	64.1381	62.2736	56.2268	55.5847	57.7337	58.3016	64.8760	68.8167	76.5696	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	124.0390	137.3289	124.0390	128.1736	124.0390	128.1736	124.0390	124.0390	128.1736	124.0390	128.1736	124.0390	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	217.8448	220.1054	214.4089	202.2817	186.9733	172.5855	162.9736	160.7131	166.4096	178.5368	193.8452	208.2329	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)	104.0222	101.8645	97.8139	89.0807	83.7011	78.0927	74.7106	77.5991	80.9745	87.1989	95.5787	102.9162	(72)
Total internal gains	505.6302	519.0230	495.9860	479.2602	454.4376	438.5761	421.4474	422.0754	435.2820	449.4989	477.3218	494.9123	(73)

---

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northeast	2.6800	11.2829	0.7600	0.7000	0.7700	11.1481	(75)

Solar gains	36.6296	74.5605	134.3344	220.6156	296.5507	316.1545	295.7560	235.7801	163.6885	91.1189	46.0895	29.9135	(83)
Total gains	542.2598	593.5835	630.3204	699.8759	750.9883	754.7306	717.2034	657.8555	598.9705	540.6178	523.4112	524.8259	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	31.3923	31.6228	31.8520	32.9749	33.1939	34.2526	34.2526	34.4561	33.8369	33.1939	32.7539	32.3063	
alpha	3.0928	3.1082	3.1235	3.1983	3.2129	3.2835	3.2835	3.2971	3.2558	3.2129	3.1836	3.1538	
util living area	0.9956	0.9937	0.9899	0.9777	0.9466	0.8687	0.7610	0.8077	0.9351	0.9833	0.9933	0.9961	(86)
MIT	18.2937	18.4867	18.8573	19.4619	20.0406	20.5655	20.8121	20.7624	20.3470	19.6231	18.9130	18.3234	(87)
Th 2	19.1956	19.2059	19.2159	19.2636	19.2726	19.3151	19.3151	19.3231	19.2987	19.2726	19.2544	19.2355	(88)
util rest of house	0.9939	0.9911	0.9855	0.9663	0.9129	0.7679	0.5553	0.6234	0.8766	0.9726	0.9902	0.9946	(89)

MIT 2	16.1817	16.4339	16.9129	17.7065	18.4284	19.0488	19.2584	19.2380	18.8210	17.9215	17.0066	16.2411	(90)
Living area fraction										fLA = Living area / (4) =		0.3296	(91)
MIT	16.8779	17.1105	17.5538	18.2851	18.9598	19.5488	19.7705	19.7405	19.3240	18.4824	17.6350	16.9275	(92)
Temperature adjustment												0.0000	
adjusted MIT	16.8779	17.1105	17.5538	18.2851	18.9598	19.5488	19.7705	19.7405	19.3240	18.4824	17.6350	16.9275	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9901	0.9862	0.9788	0.9564	0.9042	0.7861	0.6232	0.6815	0.8779	0.9647	0.9853	0.9913	(94)
Useful gains	536.9020	585.4160	616.9395	669.3945	679.0743	593.2765	446.9640	448.3464	525.8221	521.5552	515.7416	520.2755	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	2204.7862	2124.7942	1909.6654	1566.1677	1203.5132	795.0352	509.3565	533.4894	849.5692	1306.7186	1769.9212	2167.8914	(97)
Space heating kWh	1240.9058	1034.4621	961.7880	645.6767	390.1825	0.0000	0.0000	0.0000	0.0000	584.1615	903.0093	1225.8263	(98a)
Space heating requirement - total per year (kWh/year)												6986.0124	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	1240.9058	1034.4621	961.7880	645.6767	390.1825	0.0000	0.0000	0.0000	0.0000	584.1615	903.0093	1225.8263	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6986.0124	
Space heating per m2											(98c) / (4) =	88.1627	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1240.9058	1034.4621	961.7880	645.6767	390.1825	0.0000	0.0000	0.0000	0.0000	584.1615	903.0093	1225.8263	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	1240.9058	1034.4621	961.7880	645.6767	390.1825	0.0000	0.0000	0.0000	0.0000	584.1615	903.0093	1225.8263	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.6901	16.5984	14.9450	10.9493	8.4576	6.9099	7.7153	10.0286	13.0262	17.0911	19.3043	21.2651	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	6986.0124	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1985.8069	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	166.9809	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	9138.8002	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6986.0124	0.1538	1074.3811	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	1985.8069	0.1412	280.4301	(264)
Space and water heating			1354.8112	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	166.9809	0.1443	24.1005	(268)
Total CO2, kg/year			1378.9117	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			17.4000	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	6986.0124	1.5694	10963.6925	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1985.8069	1.5222	3022.7665	(278)
Space and water heating			13986.4591	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	166.9809	1.5338	256.1209	(282)
Total Primary energy kWh/year			14242.5800	(286)
Dwelling Primary energy Rate (DPER)			179.7400	(287)

Full SAP Calculation Printout

Property Reference	Apt. 1	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 1	**Prop Type Ref**	
Property			

SAP Rating	32 F	**DER**	17.40	**TER**	
Environmental	85 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.31	**DFEE**	96.83	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	179.74	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		245.6440	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8314 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9010	0.8834	0.8657	0.7774	0.7597	0.6714	0.6714	0.6537	0.7067	0.7597	0.7950	0.8304	(22b)
Effective ac	0.9059	0.8902	0.8747	0.8022	0.7886	0.7254	0.7254	0.7137	0.7497	0.7886	0.8160	0.8448	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			2.6800	2.7580	7.3915			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Corridor Wall	61.9400	2.1000	59.8400	0.1800	10.7712			(29a)
Total net area of external elements Aum(A, m2)			197.2000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	62.4127			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		39.4400 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	101.8527 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	73.4382	72.1604	70.9079	65.0249	63.9242	58.8003	58.8003	57.8514	60.7739	63.9242	66.1509	68.4788	(38)
Heat transfer coeff	175.2909	174.0131	172.7606	166.8776	165.7769	160.6530	160.6530	159.7041	162.6266	165.7769	168.0036	170.3315	(39)

Average = Sum(39)m / 12 = 166.8723

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2122	2.1960	2.1802	2.1060	2.0921	2.0274	2.0274	2.0154	2.0523	2.0921	2.1202	2.1496	(40)
HLP (average)												2.1059	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4483 (42)

Hot water usage for mixer showers

73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)

Average daily hot water use (litres/day) 103.7251 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)
Energy content (annual)											Total = Sum(45)m =	1723.0069	
Distribution loss (46)m = 0.15 x (45)m	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)
										Total per year (kWh/year) = Sum(64)m =		1985.8069	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	77.3925	68.4530	72.7736	64.1381	62.2736	56.2268	55.5847	57.7337	58.3016	64.8760	68.8167	76.5696	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	23.6379	20.9950	17.0742	12.9263	9.6626	8.1575	8.8145	11.4574	15.3781	19.5261	22.7898	24.2948	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	325.1415	328.5155	320.0132	301.9129	279.0646	257.5903	243.2442	239.8703	248.3725	266.4728	289.3212	310.7954	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)	104.0222	101.8645	97.8139	89.0807	83.7011	78.0927	74.7106	77.5991	80.9745	87.1989	95.5787	102.9162	(72)
Total internal gains	553.9052	552.4786	536.0050	505.0235	473.5319	444.9442	427.8730	430.0304	445.8288	474.3014	508.7933	539.1101	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northeast	2.6800	11.2829	0.7600	0.7000	0.7700	11.1481	(75)

Solar gains	36.6296	74.5605	134.3344	220.6156	296.5507	316.1545	295.7560	235.7801	163.6885	91.1189	46.0895	29.9135	(83)
Total gains	590.5348	627.0391	670.3394	725.6392	770.0826	761.0987	723.6290	665.8106	609.5174	565.4203	554.8828	569.0236	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	31.3923	31.6228	31.8520	32.9749	33.1939	34.2526	34.2526	34.4561	33.8369	33.1939	32.7539	32.3063	
alpha	3.0928	3.1082	3.1235	3.1983	3.2129	3.2835	3.2835	3.2971	3.2558	3.2129	3.1836	3.1538	
util living area	0.9943	0.9926	0.9880	0.9754	0.9431	0.8664	0.7575	0.8035	0.9323	0.9811	0.9921	0.9951	(86)
MIT	18.3474	18.5237	18.9010	19.4890	20.0584	20.5699	20.8149	20.7667	20.3565	19.6498	18.9482	18.3731	(87)
Th 2	19.1956	19.2059	19.2159	19.2636	19.2726	19.3151	19.3151	19.3231	19.2987	19.2726	19.2544	19.2355	(88)
util rest of house	0.9922	0.9897	0.9828	0.9629	0.9078	0.7647	0.5515	0.6181	0.8720	0.9691	0.9884	0.9932	(89)
MIT 2	16.2500	16.4809	16.9679	17.7397	18.4484	19.0525	19.2596	19.2401	18.8307	17.9543	17.0511	16.3045	(90)

Living area fraction										fLA = Living area / (4) =		0.3296	(91)
MIT	16.9414	17.1543	17.6051	18.3163	18.9791	19.5527	19.7722	19.7433	19.3336	18.5132	17.6765	16.9864	(92)
Temperature adjustment												0.0000	
adjusted MIT	16.9414	17.1543	17.6051	18.3163	18.9791	19.5527	19.7722	19.7433	19.3336	18.5132	17.6765	16.9864	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9877	0.9842	0.9753	0.9527	0.8994	0.7833	0.6195	0.6767	0.8738	0.9608	0.9830	0.9892	(94)
Useful gains	583.2510	617.1150	653.7846	691.3049	692.5890	596.1467	448.3047	450.5704	532.6005	543.2463	545.4250	562.9014	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	2215.9183	2132.4007	1918.5273	1571.3769	1206.7143	795.6617	509.6283	533.9435	851.1258	1311.8272	1776.8833	2177.9193	(97)
Space heating kWh													
	1214.7045	1018.2719	940.9686	633.6519	382.5092	0.0000	0.0000	0.0000	0.0000	571.8242	886.6499	1201.5733	(98a)
Space heating requirement - total per year (kWh/year)												6850.1534	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	1214.7045	1018.2719	940.9686	633.6519	382.5092	0.0000	0.0000	0.0000	0.0000	571.8242	886.6499	1201.5733	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6850.1534	
Space heating per m2											(98c) / (4) =	86.4482	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	1214.7045	1018.2719	940.9686	633.6519	382.5092	0.0000	0.0000	0.0000	0.0000	571.8242	886.6499	1201.5733	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	1214.7045	1018.2719	940.9686	633.6519	382.5092	0.0000	0.0000	0.0000	0.0000	571.8242	886.6499	1201.5733	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.6901	16.5984	14.9450	10.9493	8.4576	6.9099	7.7153	10.0286	13.0262	17.0911	19.3043	21.2651	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	6850.1534	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1985.8069	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	166.9809	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	9002.9413	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6850.1534	16.4900	1129.5903	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1985.8069	16.4900	327.4596	(247)

Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	166.9809	16.4900	27.5352	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1484.5850	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	4.3018	(257)
SAP value		32.4456	
SAP rating (Section 12)		32	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6850.1534	0.1538	1053.5006	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1985.8069	0.1412	280.4301	(264)
Space and water heating			1333.9307	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	166.9809	0.1443	24.1005	(268)
Total CO2, kg/year			1358.0312	(272)
CO2 emissions per m2			17.1400	(273)
EI value			85.3529	
EI rating			85	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		245.6440	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 = 0.0000	(6a)
Number of open flues	0 * 20 = 0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000	(6d)
Number of flues attached to other heater	0 * 35 = 0.0000	(6e)
Number of blocked chimneys	0 * 20 = 0.0000	(6f)
Number of intermittent extract fans	2 * 10 = 20.0000	(7a)
Number of passive vents	0 * 10 = 0.0000	(7b)
Number of flueless gas fires	0 * 40 = 0.0000	(7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.0814	(8)
Pressure test	No	
Pressure Test Method	Blower Door	
Measured/design AP50	15.0000	(17)
Infiltration rate	0.8314	(18)
Number of sides sheltered	2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.7067	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8480	0.8304	0.8127	0.7420	0.7244	0.6537	0.6537	0.6537	0.6537	0.7420	0.7597	0.7950	(22b)
Effective ac	0.8596	0.8448	0.8303	0.7753	0.7624	0.7137	0.7137	0.7137	0.7137	0.7753	0.7886	0.8160	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			2.6800	2.7580	7.3915			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Corridor Wall	61.9400	2.1000	59.8400	0.1800	10.7712			(29a)
Total net area of external elements Aum(A, m2)			197.2000					(31)

Fabric heat loss, W/K = Sum (A x U) (26)...(30) + (32) = 62.4127 (33)
Party Ceiling 1 79.2400 (32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area) 39.4400 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 101.8527 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	69.6807	68.4788	67.3022	62.8488	61.7987	57.8514	57.8514	57.8514	57.8514	62.8488	63.9242	66.1509	(38)
Heat transfer coeff	171.5334	170.3315	169.1549	164.7015	163.6514	159.7041	159.7041	159.7041	159.7041	164.7015	165.7769	168.0036	(39)

Average = Sum(39)m / 12 = 164.7226

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.1647	2.1496	2.1347	2.0785	2.0653	2.0154	2.0154	2.0154	2.0154	2.0785	2.0921	2.1202	(40)
HLP (average)												2.0788	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4483 (42)

Hot water usage for mixer showers	73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)

Average daily hot water use (litres/day) 103.7251 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)

Energy content (annual) Total = Sum(45)m = 1723.0069

Distribution loss (46)m = 0.15 x (45)m	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)

Water storage loss:
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)
Temperature factor from Table 2b 0.6000 (49)
Enter (49) or (54) in (55) 0.7200 (55)

Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)

Total per year (kWh/year) = Sum(64)m = 1985.8069 (64)

Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month	77.3925	68.4530	72.7736	64.1381	62.2736	56.2268	55.5847	57.7337	58.3016	64.8760	68.8167	76.5696	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	23.6379	20.9950	17.0742	12.9263	9.6626	8.1575	8.8145	11.4574	15.3781	19.5261	22.7898	24.2948	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	325.1415	328.5155	320.0132	301.9129	279.0646	257.5903	243.2442	239.8703	248.3725	266.4728	289.3212	310.7954	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)	104.0222	101.8645	97.8139	89.0807	83.7011	78.0927	74.7106	77.5991	80.9745	87.1989	95.5787	102.9162	(72)
Total internal gains	553.9052	552.4786	536.0050	505.0235	473.5319	444.9442	427.8730	430.0304	445.8288	474.3014	508.7933	539.1101	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Northeast	2.6800	10.4150	0.7600	0.7000	0.7700	10.2906	(75)

Solar gains	33.8119	70.4183	132.9351	223.5572	295.0062	320.8968	291.0615	228.2712	163.6885	89.7383	43.2962	28.4891	(83)
Total gains	587.7171	622.8969	668.9401	728.5807	768.5380	765.8410	718.9344	658.3016	609.5174	564.0397	552.0895	567.5992	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	32.0799	32.3063	32.5310	33.4106	33.6250	34.4561	34.4561	34.4561	34.4561	33.4106	33.1939	32.7539	
alpha	3.1387	3.1538	3.1687	3.2274	3.2417	3.2971	3.2971	3.2971	3.2971	3.2274	3.2129	3.1836	
util living area	0.9941	0.9924	0.9876	0.9738	0.9380	0.8593	0.7755	0.8149	0.9312	0.9807	0.9916	0.9948	(86)
MIT	18.4746	18.6274	18.9831	19.5531	20.1281	20.5933	20.7930	20.7497	20.3755	19.6771	19.0480	18.4815	(87)
Th 2	19.2258	19.2355	19.2450	19.2815	19.2902	19.3231	19.3231	19.3231	19.3231	19.2815	19.2726	19.2544	(88)
util rest of house	0.9918	0.9893	0.9822	0.9605	0.8988	0.7531	0.5843	0.6378	0.8707	0.9684	0.9875	0.9928	(89)
MIT 2	16.4292	16.6296	17.0886	17.8306	18.5428	19.0807	19.2530	19.2287	18.8680	17.9939	17.1888	16.4537	(90)
Living area fraction										fLA = Living area / (4) =		0.3296	(91)
MIT	17.1034	17.2882	17.7131	18.3984	19.0654	19.5793	19.7606	19.7301	19.3650	18.5487	17.8016	17.1221	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.1034	17.2882	17.7131	18.3984	19.0654	19.5793	19.7606	19.7301	19.3650	18.5487	17.8016	17.1221	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9872	0.9838	0.9747	0.9502	0.8916	0.7739	0.6456	0.6926	0.8729	0.9600	0.9819	0.9887	(94)
Useful gains	580.1793	612.8176	652.0034	692.2741	685.2461	592.6814	464.1566	455.9080	532.0189	541.4915	542.0785	561.1727	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	2127.6029	2058.9973	1862.9255	1531.4639	1156.2615	779.2470	536.7070	547.8003	840.8344	1292.6976	1707.7720	2103.7656	(97)
Space heating kWh	1151.2832	971.8328	900.9261	604.2167	350.4355	0.0000	0.0000	0.0000	0.0000	558.8974	839.2994	1147.6891	(98a)
Space heating requirement - total per year (kWh/year)												6524.5801	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	1151.2832	971.8328	900.9261	604.2167	350.4355	0.0000	0.0000	0.0000	0.0000	558.8974	839.2994	1147.6891	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6524.5801	
Space heating per m2											(98c) / (4) =	82.3395	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1151.2832	971.8328	900.9261	604.2167	350.4355	0.0000	0.0000	0.0000	0.0000	558.8974	839.2994	1147.6891	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	1151.2832	971.8328	900.9261	604.2167	350.4355	0.0000	0.0000	0.0000	0.0000	558.8974	839.2994	1147.6891	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.6901	16.5984	14.9450	10.9493	8.4576	6.9099	7.7153	10.0286	13.0262	17.0911	19.3043	21.2651	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 6524.5801 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 1985.8069 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 166.9809 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation 0.0000 (233)
Wind generation 0.0000 (234)
Hydro-electric generation (Appendix N) 0.0000 (235a)
Electricity generated - Micro CHP (Appendix N) 0.0000 (235)
Appendix Q - special features
Energy saved or generated -0.0000 (236)

Energy used		0.0000 (237)
Total delivered energy for all uses		8677.3679 (238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6524.5801	26.0600	1700.3056	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1985.8069	26.0600	517.5013	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	166.9809	26.0600	43.5152	(250)
Additional standing charges			0.0000	(251)
Total energy cost			2261.3221	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6524.5801	0.1538	1003.4721	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1985.8069	0.1412	280.4301	(264)
Space and water heating			1283.9022	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	166.9809	0.1443	24.1005	(268)
Total CO2, kg/year			1308.0027	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	6524.5801	1.5694	10239.7899	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1985.8069	1.5222	3022.7665	(278)
Space and water heating			13262.5564	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	166.9809	1.5338	256.1209	(282)
Total Primary energy kWh/year			13518.6773	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 1

Current energy efficiency rating: F 32
Current environmental impact rating: B 85

N	Solar water heating		Not applicable
U	Solar photovoltaic panels		Not applicable
V2	Wind turbine		Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: F 32
Potential environmental impact rating: B 85

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£2261	£2261	£0
Space heating	£1700	£1700	£0
Water heating	£518	£518	£0
Lighting	£44	£44	£0
Total cost of fuels	£2261	£2261	£0
Total cost of uses	£2262	£2262	£0
Delivered energy	110 kWh/m²	110 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.3 tonnes	1.3 tonnes	0.0 tonnes
CO2 emissions per m²	17 kg/m²	17 kg/m²	0 kg/m²
Primary energy	171 kWh/m²	171 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400 (1b)	x	3.1000 (2b)	=	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	245.6440	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8314	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9010	0.8834	0.8657	0.7774	0.7597	0.6714	0.6714	0.6537	0.7067	0.7597	0.7950	0.8304	(22b)
Effective ac	0.9059	0.8902	0.8747	0.8022	0.7886	0.7254	0.7254	0.7137	0.7497	0.7886	0.8160	0.8448	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			2.6800	2.7580	7.3915			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Corridor Wall	61.9400	2.1000	59.8400	0.1800	10.7712			(29a)
Total net area of external elements Aum(A, m2)			197.2000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		62.4127			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	39.4400	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	101.8527	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	73.4382	72.1604	70.9079	65.0249	63.9242	58.8003	58.8003	57.8514	60.7739	63.9242	66.1509	68.4788	(38)
Heat transfer coeff	175.2909	174.0131	172.7606	166.8776	165.7769	160.6530	160.6530	159.7041	162.6266	165.7769	168.0036	170.3315	(39)
Average = Sum(39)m / 12 =												166.8723	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2122	2.1960	2.1802	2.1060	2.0921	2.0274	2.0274	2.0154	2.0523	2.0921	2.1202	2.1496	(40)
HLP (average)												2.1059	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.4483	(42)

Hot water usage for mixer showers

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)

Hot water usage for baths

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

	39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)
Average daily hot water use (litres/day)												103.7251	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)
Energy content (annual)										Total = Sum(45)m =		1723.0069	
Distribution loss (46)m = 0.15 x (45)m	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)

Water storage loss:		
Store volume	150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2000	(48)
Temperature factor from Table 2b	0.6000	(49)
Enter (49) or (54) in (55)	0.7200	(55)

Total storage loss

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)

Total per year (kWh/year) = Sum(64)m = 1985.8069 (64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

	77.3925	68.4530	72.7736	64.1381	62.2736	56.2268	55.5847	57.7337	58.3016	64.8760	68.8167	76.5696	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	23.6379	20.9950	17.0742	12.9263	9.6626	8.1575	8.8145	11.4574	15.3781	19.5261	22.7898	24.2948	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	325.1415	328.5155	320.0132	301.9129	279.0646	257.5903	243.2442	239.8703	248.3725	266.4728	289.3212	310.7954	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)

Water heating gains (Table 5)

	104.0222	101.8645	97.8139	89.0807	83.7011	78.0927	74.7106	77.5991	80.9745	87.1989	95.5787	102.9162	(72)

Total internal gains

	553.9052	552.4786	536.0050	505.0235	473.5319	444.9442	427.8730	430.0304	445.8288	474.3014	508.7933	539.1101	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northeast	2.6800	11.2829	0.7600	0.7000	0.7700	11.1481	(75)

Solar gains	36.6296	74.5605	134.3344	220.6156	296.5507	316.1545	295.7560	235.7801	163.6885	91.1189	46.0895	29.9135	(83)
Total gains	590.5348	627.0391	670.3394	725.6392	770.0826	761.0987	723.6290	665.8106	609.5174	565.4203	554.8828	569.0236	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	31.3923	31.6228	31.8520	32.9749	33.1939	34.2526	34.2526	34.4561	33.8369	33.1939	32.7539	32.3063	
alpha	3.0928	3.1082	3.1235	3.1983	3.2129	3.2835	3.2835	3.2971	3.2558	3.2129	3.1836	3.1538	
util living area	0.9943	0.9926	0.9880	0.9754	0.9431	0.8664	0.7575	0.8035	0.9323	0.9811	0.9921	0.9951	(86)
MIT	18.3474	18.5237	18.9010	19.4890	20.0584	20.5699	20.8149	20.7667	20.3565	19.6498	18.9482	18.3731	(87)
Th 2	19.1956	19.2059	19.2159	19.2636	19.2726	19.3151	19.3151	19.3231	19.2987	19.2726	19.2544	19.2355	(88)
util rest of house	0.9922	0.9897	0.9828	0.9629	0.9078	0.7647	0.5515	0.6181	0.8720	0.9691	0.9884	0.9932	(89)
MIT 2	16.2500	16.4809	16.9679	17.7397	18.4484	19.0525	19.2596	19.2401	18.8307	17.9543	17.0511	16.3045	(90)
Living area fraction									fLA = Living area / (4) =			0.3296	(91)
MIT	16.9414	17.1543	17.6051	18.3163	18.9791	19.5527	19.7722	19.7433	19.3336	18.5132	17.6765	16.9864	(92)
Temperature adjustment												0.0000	
adjusted MIT	16.9414	17.1543	17.6051	18.3163	18.9791	19.5527	19.7722	19.7433	19.3336	18.5132	17.6765	16.9864	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9877	0.9842	0.9753	0.9527	0.8994	0.7833	0.6195	0.6767	0.8738	0.9608	0.9830	0.9892	(94)
Useful gains	583.2510	617.1150	653.7846	691.3049	692.5890	596.1467	448.3047	450.5704	532.6005	543.2463	545.4250	562.9014	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	2215.9183	2132.4007	1918.5273	1571.3769	1206.7143	795.6617	509.6283	533.9435	851.1258	1311.8272	1776.8833	2177.9193	(97)
Space heating kWh	1214.7045	1018.2719	940.9686	633.6519	382.5092	0.0000	0.0000	0.0000	0.0000	571.8242	886.6499	1201.5733	(98a)

Space heating requirement - total per year (kWh/year) 6850.1534

Solar heating kWh

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

	1214.7045	1018.2719	940.9686	633.6519	382.5092	0.0000	0.0000	0.0000	0.0000	571.8242	886.6499	1201.5733	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 6850.1534

Space heating per m2 (98c) / (4) = 86.4482 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	1214.7045	1018.2719	940.9686	633.6519	382.5092	0.0000	0.0000	0.0000	0.0000	571.8242	886.6499	1201.5733	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	1214.7045	1018.2719	940.9686	633.6519	382.5092	0.0000	0.0000	0.0000	0.0000	571.8242	886.6499	1201.5733	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.6901	16.5984	14.9450	10.9493	8.4576	6.9099	7.7153	10.0286	13.0262	17.0911	19.3043	21.2651	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 6850.1534 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 1985.8069 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 166.9809 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation 0.0000 (233)
Wind generation 0.0000 (234)
Hydro-electric generation (Appendix N) 0.0000 (235a)
Electricity generated - Micro CHP (Appendix N) 0.0000 (235)
Appendix Q - special features
Energy saved or generated -0.0000 (236)
Energy used 0.0000 (237)
Total delivered energy for all uses 9002.9413 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6850.1534	16.4900	1129.5903	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1985.8069	16.4900	327.4596	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	166.9809	16.4900	27.5352	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1484.5850	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12): 0.3600 (256)
Energy cost factor (ECF) [(255) x (256)] / [(4) + 45.0] = 4.3018 (257)
SAP value 32.4456
SAP rating (Section 12) 32 (258)
SAP band F

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6850.1534	0.1538	1053.5006	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1985.8069	0.1412	280.4301	(264)
Space and water heating			1333.9307	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	166.9809	0.1443	24.1005	(268)
Total CO2, kg/year			1358.0312	(272)
CO2 emissions per m2			17.1400	(273)
EI value			85.3529	
EI rating			85	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400 (1b)	x	3.1000 (2b)	=	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	245.6440	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8314	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8480	0.8304	0.8127	0.7420	0.7244	0.6537	0.6537	0.6537	0.6537	0.7420	0.7597	0.7950	(22b)
Effective ac	0.8596	0.8448	0.8303	0.7753	0.7624	0.7137	0.7137	0.7137	0.7137	0.7753	0.7886	0.8160	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			2.6800	2.7580	7.3915			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Corridor Wall	61.9400	2.1000	59.8400	0.1800	10.7712			(29a)
Total net area of external elements Aum(A, m2)			197.2000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		62.4127			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	39.4400	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 101.8527	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	69.6807	68.4788	67.3022	62.8488	61.7987	57.8514	57.8514	57.8514	57.8514	62.8488	63.9242	66.1509	(38)
Heat transfer coeff	171.5334	170.3315	169.1549	164.7015	163.6514	159.7041	159.7041	159.7041	159.7041	164.7015	165.7769	168.0036	(39)
Average = Sum(39)m / 12 =												164.7226	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.1647	2.1496	2.1347	2.0785	2.0653	2.0154	2.0154	2.0154	2.0154	2.0785	2.0921	2.1202	(40)
HLP (average)												2.0788	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.4483	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)

Average daily hot water use (litres/day)	103.7251	(43)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Daily hot water use

	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)
Energy content (annual)										Total = Sum(45)m =		1723.0069	
Distribution loss (46)m = 0.15 x (45)m													
	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)
										Total per year (kWh/year) = Sum(64)m =		1985.8069	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	77.3925	68.4530	72.7736	64.1381	62.2736	56.2268	55.5847	57.7337	58.3016	64.8760	68.8167	76.5696	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.6379	20.9950	17.0742	12.9263	9.6626	8.1575	8.8145	11.4574	15.3781	19.5261	22.7898	24.2948	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	325.1415	328.5155	320.0132	301.9129	279.0646	257.5903	243.2442	239.8703	248.3725	266.4728	289.3212	310.7954	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)													
	104.0222	101.8645	97.8139	89.0807	83.7011	78.0927	74.7106	77.5991	80.9745	87.1989	95.5787	102.9162	(72)
Total internal gains													
	553.9052	552.4786	536.0050	505.0235	473.5319	444.9442	427.8730	430.0304	445.8288	474.3014	508.7933	539.1101	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Northeast	2.6800	10.4150	0.7600	0.7000	0.7700	10.2906	(75)

Solar gains	33.8119	70.4183	132.9351	223.5572	295.0062	320.8968	291.0615	228.2712	163.6885	89.7383	43.2962	28.4891	(83)
Total gains	587.7171	622.8969	668.9401	728.5807	768.5380	765.8410	718.9344	658.3016	609.5174	564.0397	552.0895	567.5992	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	32.0799	32.3063	32.5310	33.4106	33.6250	34.4561	34.4561	34.4561	34.4561	33.4106	33.1939	32.7539	
alpha	3.1387	3.1538	3.1687	3.2274	3.2417	3.2971	3.2971	3.2971	3.2971	3.2274	3.2129	3.1836	
util living area													
	0.9941	0.9924	0.9876	0.9738	0.9380	0.8593	0.7755	0.8149	0.9312	0.9807	0.9916	0.9948	(86)
MIT	18.4746	18.6274	18.9831	19.5531	20.1281	20.5933	20.7930	20.7497	20.3755	19.6771	19.0480	18.4815	(87)
Th 2	19.2258	19.2355	19.2450	19.2815	19.2902	19.3231	19.3231	19.3231	19.3231	19.2815	19.2726	19.2544	(88)
util rest of house													
	0.9918	0.9893	0.9822	0.9605	0.8988	0.7531	0.5843	0.6378	0.8707	0.9684	0.9875	0.9928	(89)
MIT 2	16.4292	16.6296	17.0886	17.8306	18.5428	19.0807	19.2530	19.2287	18.8680	17.9939	17.1888	16.4537	(90)
Living area fraction										fLA = Living area / (4) =		0.3296	(91)
MIT	17.1034	17.2882	17.7131	18.3984	19.0654	19.5793	19.7606	19.7301	19.3650	18.5487	17.8016	17.1221	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.1034	17.2882	17.7131	18.3984	19.0654	19.5793	19.7606	19.7301	19.3650	18.5487	17.8016	17.1221	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9872	0.9838	0.9747	0.9502	0.8916	0.7739	0.6456	0.6926	0.8729	0.9600	0.9819	0.9887	(94)
Useful gains	580.1793	612.8176	652.0034	692.2741	685.2461	592.6814	464.1566	455.9080	532.0189	541.4915	542.0785	561.1727	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	2127.6029	2058.9973	1862.9255	1531.4639	1156.2615	779.2470	536.7070	547.8003	840.8344	1292.6976	1707.7720	2103.7656	(97)
Space heating kWh													
	1151.2832	971.8328	900.9261	604.2167	350.4355	0.0000	0.0000	0.0000	0.0000	558.8974	839.2994	1147.6891	(98a)
Space heating requirement - total per year (kWh/year)												6524.5801	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	

Space heating kWh

1151.2832	971.8328	900.9261	604.2167	350.4355	0.0000	0.0000	0.0000	0.0000	558.8974	839.2994	1147.6891	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 6524.5801

Space heating per m2 (98c) / (4) = 82.3395 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	1151.2832	971.8328	900.9261	604.2167	350.4355	0.0000	0.0000	0.0000	0.0000	558.8974	839.2994	1147.6891	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	1151.2832	971.8328	900.9261	604.2167	350.4355	0.0000	0.0000	0.0000	0.0000	558.8974	839.2994	1147.6891	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	201.3772	177.5283	187.4856	162.5266	155.9068	138.7331	135.7897	142.2530	144.9734	163.7334	176.5975	198.9024	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.6901	16.5984	14.9450	10.9493	8.4576	6.9099	7.7153	10.0286	13.0262	17.0911	19.3043	21.2651	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1	6524.5801	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1985.8069	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	166.9809	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	8677.3679	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6524.5801	26.0600	1700.3056	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1985.8069	26.0600	517.5013	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	166.9809	26.0600	43.5152	(250)
Additional standing charges			0.0000	(251)
Total energy cost			2261.3221	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6524.5801	0.1538	1003.4721	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1985.8069	0.1412	280.4301	(264)
Space and water heating			1283.9022	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	166.9809	0.1443	24.1005	(268)
Total CO2, kg/year			1308.0027	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	6524.5801	1.5694	10239.7899	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1985.8069	1.5222	3022.7665	(278)
Space and water heating			13262.5564	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	166.9809	1.5338	256.1209	(282)
Total Primary energy kWh/year			13518.6773	(286)

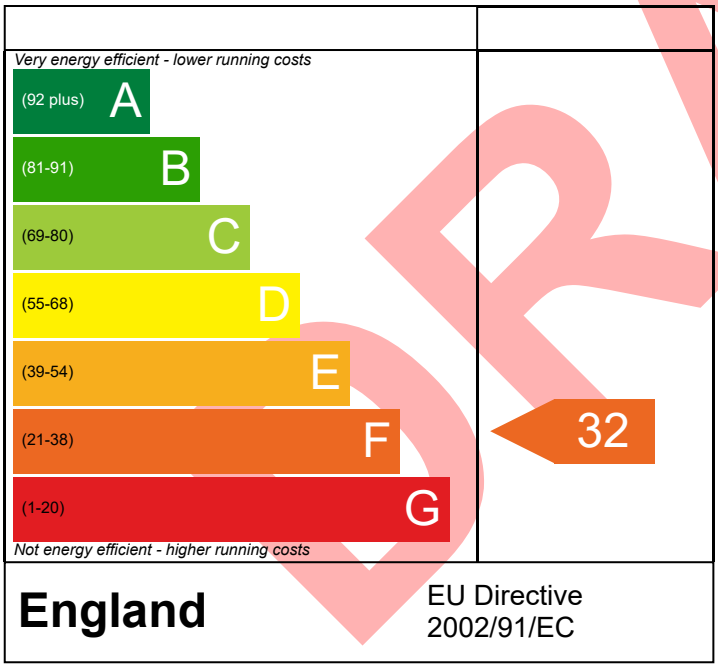
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	79.24 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

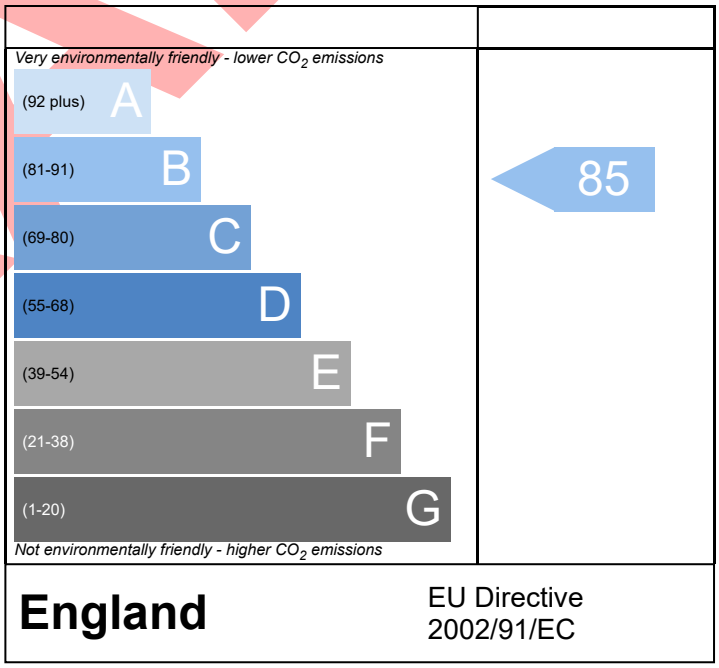
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

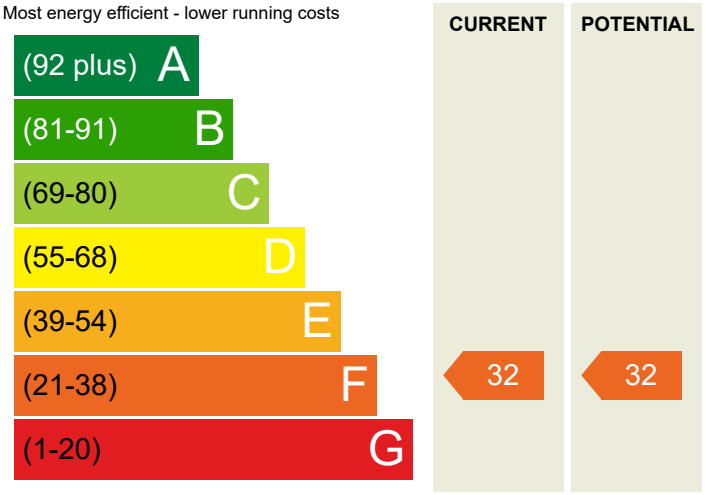
Energy Report

Dwelling Address	
Reference	Apt. 1-Apt. 1
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	79

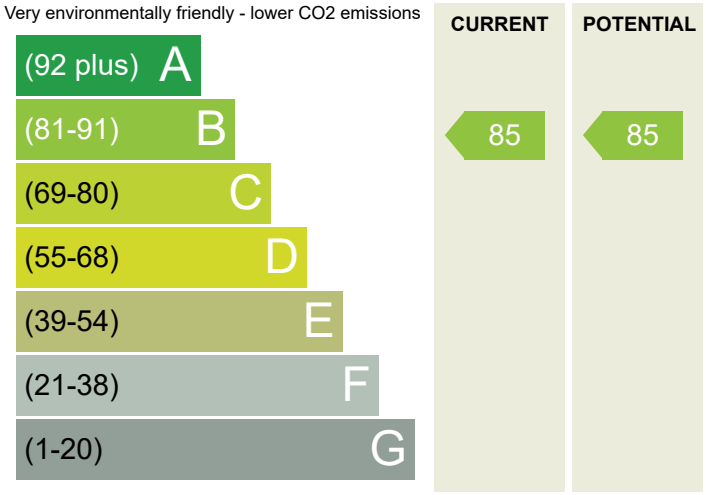
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

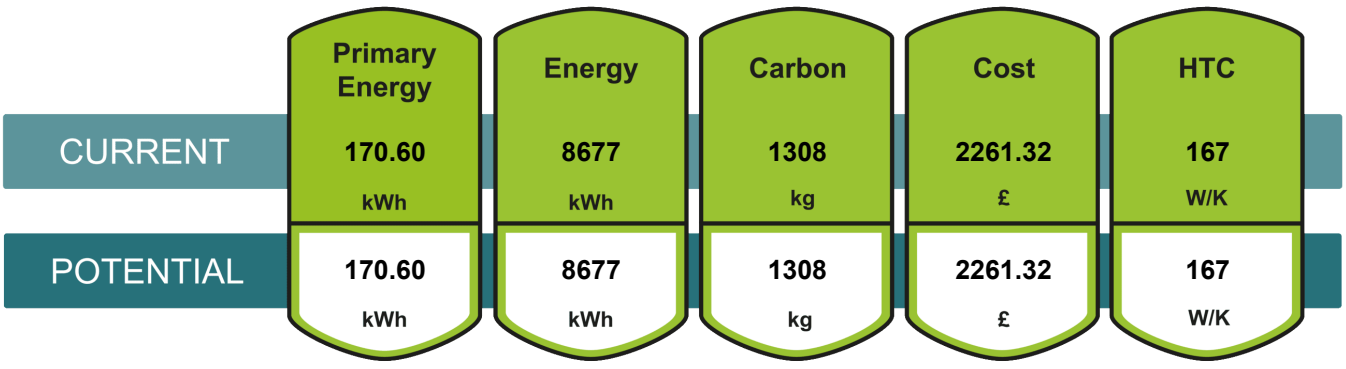
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.23 W/m²K	Very Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	Fully double glazed	Average
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£44	£44	
Heating	£1700	£1700	
Hot Water	£518	£518	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£2261	£2261	

Estimated energy use and potential savings

Space Heating
6525
kWh per year

Water Heating
1986
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 1	Issued on Date	01/10/2024
Assessment Reference	Apt. 1	Prop Type Ref	Detached Flat
Property			

SAP Rating	32 F	DER	17.40	TER	
Environmental	85 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.31	DFEE	96.83	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	179.74	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Southeast (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	56.02	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	61.94	m²	

Comments

Heat Loss Floors

Description	Heatloss Floor 1		
Type	Ground Floor - Timber		
Construction	Other		
U-value	0.25	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	79.24	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NE1	New Glazing	External Wall 1	North East	5.36
W NE2	Existing Glazing	External Wall 1	North East	2.68
D SE	New Door	Corridor Wall	South East	2.10

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1

Fuel Type	SAP table	
Winter Efficiency	Electricity	
Summer Efficiency		%
Model Name		%
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue		
Heat Emitter	No	

Flow Temperature	
Flow Temperature Value	

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	Hot Water Cylinder	
Independent Time Control	No	
Cylinder Stat	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day
Pipes insulation		

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 2	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 2	**Prop Type Ref**	
Property			

SAP Rating	37 F	**DER**	18.39	**TER**	
Environmental	87 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.99	**DFEE**	96.31	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	190.30	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	20.65 m	56.79 m²	3.10 m

8.0 Living Area	24.78	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	51.55	44.83	0.00	None	6.72	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	17.21	15.11	0.00	None	2.10	Enter Gross Area

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	56.79

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Other	0.25	None	0.00	0.00	56.79

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NE1	Existing Glazing	External Wall 1	North East	5.36	0

Summary for Input Data

elmhurst energy

W SE1	New Glazing	External Wall 1	South East	1.36	0
D NW	New Door	Corridor Wall	North West	2.10	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	100.00	10.00	1000.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	

Summary for Input Data

SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 2	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 2	**Prop Type Ref**	
Property			

SAP Rating	37 F	**DER**	18.39	**TER**	
Environmental	87 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.99	**DFEE**	96.31	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	190.30	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.7900	(1b)	x 3.1000	(2b) =	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		176.0490	(5)

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2. Ventilation rate

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			m3 per hour	
Number of open chimneys		0 * 80 =	0.0000	(6a)
Number of open flues		0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000	(6d)
Number of flues attached to other heater		0 * 35 =	0.0000	(6e)
Number of blocked chimneys		0 * 20 =	0.0000	(6f)
Number of intermittent extract fans		2 * 10 =	20.0000	(7a)
Number of passive vents		0 * 10 =	0.0000	(7b)
Number of flueless gas fires		0 * 40 =	0.0000	(7c)
		Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =		20.0000 / (5) =	0.1136	(8)
Pressure test			No	
Pressure Test Method			Blower Door	
Measured/design AP50			15.0000	(17)
Infiltration rate			0.8636	(18)
Number of sides sheltered			2	(19)
Shelter factor		(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor		(21) = (18) x (20) =	0.7341	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9359	0.9176	0.8992	0.8075	0.7891	0.6974	0.6974	0.6790	0.7341	0.7891	0.8258	0.8625	(22b)
Effective ac	0.9380	0.9210	0.9043	0.8260	0.8114	0.7432	0.7432	0.7305	0.7694	0.8114	0.8410	0.8720	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			1.3600	1.3258	1.8030			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			5.3600	2.7580	14.7829			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Corridor Wall	17.2100	2.1000	15.1100	0.1800	2.7198			(29a)
Total net area of external elements Aum(A, m2)			125.5500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		49.8922			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		25.1100	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	75.0022	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4933	53.5052	52.5367	47.9877	47.1366	43.1745	43.1745	42.4408	44.7006	47.1366	48.8584	50.6584	(38)
Heat transfer coeff	129.4955	128.5075	127.5390	122.9899	122.1388	118.1768	118.1768	117.4431	119.7029	122.1388	123.8606	125.6606	(39)

Average = Sum(39)m / 12 = 122.9859

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2803	2.2629	2.2458	2.1657	2.1507	2.0809	2.0809	2.0680	2.1078	2.1507	2.1810	2.2127	(40)
HLP (average)												2.1656	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8896 (42)

Hot water usage for mixer showers

62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)

Average daily hot water use (litres/day) 88.7832 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)											Total = Sum(45)m =	1474.8031	
Distribution loss (46)m = 0.15 x (45)m													
	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
											Total per year (kWh/year) = Sum(64)m =	1737.6031	(64)
12Total per year (kWh/year)												1738	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.8161	60.9154	64.8626	57.3881	55.8752	50.6164	50.1498	51.9892	52.3923	58.1026	61.3927	68.1118	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	91.9591	101.8119	91.9591	95.0244	91.9591	95.0244	91.9591	91.9591	95.0244	91.9591	95.0244	91.9591	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	164.7851	166.4950	162.1860	153.0126	141.4328	130.5494	123.2787	121.5687	125.8778	135.0512	146.6309	157.5143	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	92.4948	90.6479	87.1809	79.7057	75.1010	70.3005	67.4056	69.8780	72.7671	78.0949	85.2676	91.5481	(72)
Total internal gains													
	400.5826	410.2985	392.6697	379.0863	359.8366	347.2181	333.9871	334.7495	345.0130	356.4488	378.2666	392.3652	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Northeast	5.3600	11.2829	0.7600	0.7000	0.7700	22.2963	(75)

Solar gains	43.3801	81.2983	130.9074	195.1729	248.7056	260.1451	245.2986	203.3370	152.8433	95.1559	53.3081	36.2517	(83)
Total gains	443.9628	491.5969	523.5771	574.2593	608.5422	607.3632	579.2857	538.0865	497.8563	451.6048	431.5747	428.6168	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	30.4547	30.6889	30.9219	32.0656	32.2891	33.3716	33.3716	33.5801	32.9462	32.2891	31.8402	31.3841	
alpha	3.0303	3.0459	3.0615	3.1377	3.1526	3.2248	3.2248	3.2387	3.1964	3.1526	3.1227	3.0923	
util living area													
	0.9934	0.9904	0.9849	0.9684	0.9298	0.8393	0.7206	0.7656	0.9105	0.9749	0.9900	0.9942	(86)
MIT	18.3052	18.5169	18.9014	19.5153	20.0899	20.6020	20.8345	20.7925	20.4011	19.6749	18.9430	18.3353	(87)
Th 2	19.1530	19.1639	19.1745	19.2252	19.2348	19.2799	19.2799	19.2884	19.2624	19.2348	19.2154	19.1953	(88)
util rest of house													
	0.9909	0.9866	0.9783	0.9528	0.8879	0.7264	0.5084	0.5695	0.8366	0.9594	0.9854	0.9921	(89)

MIT 2	16.1733	16.4491	16.9448	17.7479	18.4564	19.0482	19.2339	19.2204	18.8470	17.9617	17.0225	16.2343	(90)
Living area fraction									fLA = Living area / (4) =			0.4363	(91)
MIT	17.1035	17.3514	17.7986	18.5191	19.1691	19.7262	19.9323	19.9064	19.5251	18.7092	17.8605	17.1510	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.1035	17.3514	17.7986	18.5191	19.1691	19.7262	19.9323	19.9064	19.5251	18.7092	17.8605	17.1510	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9864	0.9808	0.9708	0.9439	0.8858	0.7623	0.6018	0.6539	0.8515	0.9524	0.9798	0.9881	(94)
Useful gains	437.9360	482.1621	508.3022	542.0447	539.0767	463.0036	348.6346	351.8728	423.9332	430.1218	422.8632	423.4953	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1658.0008	1600.0975	1441.0098	1183.0535	912.2709	605.8016	393.8010	411.7996	649.4024	990.4526	1332.8012	1627.4344	(97)
Space heating kWh	907.7282	751.2526	693.9344	461.5263	277.6565	0.0000	0.0000	0.0000	0.0000	416.8861	655.1554	895.7307	(98a)
Space heating requirement - total per year (kWh/year)												5059.8702	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	907.7282	751.2526	693.9344	461.5263	277.6565	0.0000	0.0000	0.0000	0.0000	416.8861	655.1554	895.7307	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5059.8702	
Space heating per m2											(98c) / (4) =	89.0979	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	907.7282	751.2526	693.9344	461.5263	277.6565	0.0000	0.0000	0.0000	0.0000	416.8861	655.1554	895.7307	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	907.7282	751.2526	693.9344	461.5263	277.6565	0.0000	0.0000	0.0000	0.0000	416.8861	655.1554	895.7307	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7794	14.2633	12.8425	9.4090	7.2678	5.9378	6.6299	8.6178	11.1937	14.6867	16.5886	18.2736	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5059.8702	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1737.6031	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	143.4902	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6940.9636	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5059.8702	0.1539	778.6101	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	1737.6031	0.1412	245.2846	(264)
Space and water heating			1023.8947	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.4902	0.1443	20.7101	(268)
Total CO2, kg/year			1044.6048	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			18.3900	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	5059.8702	1.5697	7942.5064	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1737.6031	1.5220	2644.5990	(278)
Space and water heating			10587.1054	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	143.4902	1.5338	220.0901	(282)
Total Primary energy kWh/year			10807.1955	(286)
Dwelling Primary energy Rate (DPER)			190.3000	(287)

Full SAP Calculation Printout

Property Reference	Apt. 2	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 2	**Prop Type Ref**	
Property			

SAP Rating	37 F	**DER**	18.39	**TER**	
Environmental	87 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.99	**DFEE**	96.31	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	190.30	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.7900	(1b)	x 3.1000	(2b) =	176.0490	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		176.0490	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8636 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9359	0.9176	0.8992	0.8075	0.7891	0.6974	0.6974	0.6790	0.7341	0.7891	0.8258	0.8625	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9380	0.9210	0.9043	0.8260	0.8114	0.7432	0.7432	0.7305	0.7694	0.8114	0.8410	0.8720	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			1.3600	1.3258	1.8030			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			5.3600	2.7580	14.7829			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Corridor Wall	17.2100	2.1000	15.1100	0.1800	2.7198			(29a)
Total net area of external elements Aum(A, m2)			125.5500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		49.8922			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		25.1100 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	75.0022 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4933	53.5052	52.5367	47.9877	47.1366	43.1745	43.1745	42.4408	44.7006	47.1366	48.8584	50.6584	(38)

Heat transfer coeff

	129.4955	128.5075	127.5390	122.9899	122.1388	118.1768	118.1768	117.4431	119.7029	122.1388	123.8606	125.6606 (39)
Average = Sum(39)m / 12 =												122.9859

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2803	2.2629	2.2458	2.1657	2.1507	2.0809	2.0809	2.0680	2.1078	2.1507	2.1810	2.2127	(40)
HLP (average)												2.1656	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8896 (42)

Hot water usage for mixer showers

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)

Hot water usage for baths

24.1627	23.8039	23.2986	22.3668	21.6691	20.8955	20.4776	20.9794	21.5258	22.3536	23.3045	24.0811	(42b)

Hot water usage for other uses

33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)

Average daily hot water use (litres/day) 53.2947 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	58.1439	56.5494	54.8084	52.6410	50.7076	48.6983	48.2804	50.0179	51.7999	53.8634	56.0500	58.0622	(44)
Energy conte	92.0858	80.5256	84.2384	72.0628	68.2622	59.8802	58.3910	61.9326	63.8745	73.0922	79.8536	90.9114	(45)
Energy content (annual)											Total = Sum(45)m =	885.1103	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	78.2729	68.4468	71.6027	61.2534	58.0228	50.8982	49.6323	52.6427	54.2933	62.1283	67.8755	77.2747	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	78.2729	68.4468	71.6027	61.2534	58.0228	50.8982	49.6323	52.6427	54.2933	62.1283	67.8755	77.2747	(64)
										Total per year (kWh/year) = Sum(64)m =		752.3438	(64)
12Total per year (kWh/year)												752	(64)
Electric shower(s)													
	44.7679	39.8885	43.5567	41.5657	42.3456	40.3936	41.7401	42.3456	41.5657	43.5567	42.7377	44.7679	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						509.2317	(64a)
Heat gains from water heating, kWh/month													
	30.7602	27.0838	28.7899	25.7048	25.0921	22.8230	22.8431	23.7471	23.9648	26.4213	27.6533	30.5106	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	91.9591	101.8119	91.9591	95.0244	91.9591	95.0244	91.9591	91.9591	95.0244	91.9591	95.0244	91.9591	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	164.7851	166.4950	162.1860	153.0126	141.4328	130.5494	123.2787	121.5687	125.8778	135.0512	146.6309	157.5143	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	41.3443	40.3033	38.6960	35.7011	33.7260	31.6985	30.7031	31.9181	33.2844	35.5125	38.4074	41.0089	(72)
Total internal gains													
	349.4322	359.9539	344.1848	335.0817	318.4616	308.6161	297.2846	296.7897	305.5302	313.8664	331.4064	341.8260	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Northeast	5.3600	11.2829	0.7600	0.7000	0.7700	22.2963	(75)

Solar gains	43.3801	81.2983	130.9074	195.1729	248.7056	260.1451	245.2986	203.3370	152.8433	95.1559	53.3081	36.2517	(83)
Total gains	392.8123	441.2522	475.0922	530.2547	567.1671	568.7612	542.5832	500.1266	458.3735	409.0223	384.7145	378.0777	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	30.4547	30.6889	30.9219	32.0656	32.2891	33.3716	33.3716	33.5801	32.9462	32.2891	31.8402	31.3841	
alpha	3.0303	3.0459	3.0615	3.1377	3.1526	3.2248	3.2248	3.2387	3.1964	3.1526	3.1227	3.0923	
util living area													
	0.9953	0.9929	0.9884	0.9744	0.9406	0.8587	0.7468	0.7927	0.9260	0.9808	0.9928	0.9960	(86)
MIT	18.2268	18.4404	18.8289	19.4525	20.0382	20.5676	20.8148	20.7674	20.3547	19.6124	18.8709	18.2568	(87)
Th 2	19.1530	19.1639	19.1745	19.2252	19.2348	19.2799	19.2799	19.2884	19.2624	19.2348	19.2154	19.1953	(88)
util rest of house													
	0.9935	0.9900	0.9833	0.9614	0.9037	0.7525	0.5360	0.6014	0.8609	0.9685	0.9894	0.9944	(89)
MIT 2	16.7531	16.9726	17.3659	18.0143	18.5837	19.0781	19.2381	19.2262	18.9035	18.1834	17.4355	16.8099	(90)
Living area fraction											fLA = Living area / (4) =	0.4363	(91)

MIT	17.3962	17.6131	18.0043	18.6419	19.2184	19.7280	19.9261	19.8987	19.5367	18.8069	18.0619	17.4412	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.3962	17.6131	18.0043	18.6419	19.2184	19.7280	19.9261	19.8987	19.5367	18.8069	18.0619	17.4412	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9908	0.9864	0.9784	0.9553	0.9032	0.7869	0.6295	0.6844	0.8748	0.9641	0.9860	0.9921	(94)
Useful gains	389.2144	435.2467	464.8107	506.5409	512.2715	447.5681	341.5733	342.2674	400.9861	394.3198	379.3116	375.0811	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1695.8968	1633.7257	1467.2461	1198.1507	918.2868	606.0111	393.0659	410.8971	650.7893	1002.3858	1357.7418	1663.9032	(97)
Space heating kWh													
	972.1717	805.3779	745.8119	497.9590	302.0754	0.0000	0.0000	0.0000	0.0000	452.4011	704.4697	958.8836	(98a)
Space heating requirement - total per year (kWh/year)												5439.1504	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	972.1717	805.3779	745.8119	497.9590	302.0754	0.0000	0.0000	0.0000	0.0000	452.4011	704.4697	958.8836	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5439.1504	
Space heating per m2											(98c) / (4) =	95.7766	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	1110.8616	874.5081	892.5672	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.5202	0.6030	0.5583	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	577.8481	527.3545	498.3588	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	624.6789	596.1265	548.3501	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	33.7182	51.1664	37.1935	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	8.4295	12.7916	9.2984	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												30.5195	(107)
Energy for space heating												95.7766	(99)
Energy for space cooling												0.5374	(108)
Total												96.3140	(109)
Fabric Energy Efficiency (DFEE)												96.3	(109)

Full SAP Calculation Printout

Property Reference	Apt. 2	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 2	**Prop Type Ref**	
Property			

SAP Rating	37 F	**DER**	18.39	**TER**	
Environmental	87 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.99	**DFEE**	96.31	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	190.30	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.7900	(1b)	x 3.1000	(2b) =	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		176.0490	(5)

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2. Ventilation rate

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			m3 per hour	
Number of open chimneys		0 * 80 =	0.0000	(6a)
Number of open flues		0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000	(6d)
Number of flues attached to other heater		0 * 35 =	0.0000	(6e)
Number of blocked chimneys		0 * 20 =	0.0000	(6f)
Number of intermittent extract fans		2 * 10 =	20.0000	(7a)
Number of passive vents		0 * 10 =	0.0000	(7b)
Number of flueless gas fires		0 * 40 =	0.0000	(7c)
		Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =		20.0000 / (5) =	0.1136	(8)
Pressure test			No	
Pressure Test Method			Blower Door	
Measured/design AP50			15.0000	(17)
Infiltration rate			0.8636	(18)
Number of sides sheltered			2	(19)
Shelter factor		(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor		(21) = (18) x (20) =	0.7341	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9359	0.9176	0.8992	0.8075	0.7891	0.6974	0.6974	0.6790	0.7341	0.7891	0.8258	0.8625	(22b)
Effective ac	0.9380	0.9210	0.9043	0.8260	0.8114	0.7432	0.7432	0.7305	0.7694	0.8114	0.8410	0.8720	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			1.3600	1.3258	1.8030			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			5.3600	2.7580	14.7829			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Corridor Wall	17.2100	2.1000	15.1100	0.1800	2.7198			(29a)
Total net area of external elements Aum(A, m2)			125.5500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		49.8922			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		25.1100	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	75.0022	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4933	53.5052	52.5367	47.9877	47.1366	43.1745	43.1745	42.4408	44.7006	47.1366	48.8584	50.6584	(38)
Heat transfer coeff	129.4955	128.5075	127.5390	122.9899	122.1388	118.1768	118.1768	117.4431	119.7029	122.1388	123.8606	125.6606	(39)

Average = Sum(39)m / 12 = 122.9859

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2803	2.2629	2.2458	2.1657	2.1507	2.0809	2.0809	2.0680	2.1078	2.1507	2.1810	2.2127	(40)
HLP (average)												2.1656	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8896 (42)

Hot water usage for mixer showers

62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)

Average daily hot water use (litres/day) 88.7832 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)											Total = Sum(45)m =	1474.8031	
Distribution loss (46)m = 0.15 x (45)m													
	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
											Total per year (kWh/year) = Sum(64)m =	1737.6031	(64)
12Total per year (kWh/year)												1738	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.8161	60.9154	64.8626	57.3881	55.8752	50.6164	50.1498	51.9892	52.3923	58.1026	61.3927	68.1118	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	91.9591	101.8119	91.9591	95.0244	91.9591	95.0244	91.9591	91.9591	95.0244	91.9591	95.0244	91.9591	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	164.7851	166.4950	162.1860	153.0126	141.4328	130.5494	123.2787	121.5687	125.8778	135.0512	146.6309	157.5143	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	92.4948	90.6479	87.1809	79.7057	75.1010	70.3005	67.4056	69.8780	72.7671	78.0949	85.2676	91.5481	(72)
Total internal gains													
	400.5826	410.2985	392.6697	379.0863	359.8366	347.2181	333.9871	334.7495	345.0130	356.4488	378.2666	392.3652	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Northeast	5.3600	11.2829	0.7600	0.7000	0.7700	22.2963	(75)

Solar gains	43.3801	81.2983	130.9074	195.1729	248.7056	260.1451	245.2986	203.3370	152.8433	95.1559	53.3081	36.2517	(83)
Total gains	443.9628	491.5969	523.5771	574.2593	608.5422	607.3632	579.2857	538.0865	497.8563	451.6048	431.5747	428.6168	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	30.4547	30.6889	30.9219	32.0656	32.2891	33.3716	33.3716	33.5801	32.9462	32.2891	31.8402	31.3841	
alpha	3.0303	3.0459	3.0615	3.1377	3.1526	3.2248	3.2248	3.2387	3.1964	3.1526	3.1227	3.0923	
util living area													
	0.9934	0.9904	0.9849	0.9684	0.9298	0.8393	0.7206	0.7656	0.9105	0.9749	0.9900	0.9942	(86)
MIT	18.3052	18.5169	18.9014	19.5153	20.0899	20.6020	20.8345	20.7925	20.4011	19.6749	18.9430	18.3353	(87)
Th 2	19.1530	19.1639	19.1745	19.2252	19.2348	19.2799	19.2799	19.2884	19.2624	19.2348	19.2154	19.1953	(88)
util rest of house													
	0.9909	0.9866	0.9783	0.9528	0.8879	0.7264	0.5084	0.5695	0.8366	0.9594	0.9854	0.9921	(89)

MIT 2	16.1733	16.4491	16.9448	17.7479	18.4564	19.0482	19.2339	19.2204	18.8470	17.9617	17.0225	16.2343	(90)
Living area fraction									fLA = Living area / (4) =			0.4363	(91)
MIT	17.1035	17.3514	17.7986	18.5191	19.1691	19.7262	19.9323	19.9064	19.5251	18.7092	17.8605	17.1510	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.1035	17.3514	17.7986	18.5191	19.1691	19.7262	19.9323	19.9064	19.5251	18.7092	17.8605	17.1510	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9864	0.9808	0.9708	0.9439	0.8858	0.7623	0.6018	0.6539	0.8515	0.9524	0.9798	0.9881	(94)
Useful gains	437.9360	482.1621	508.3022	542.0447	539.0767	463.0036	348.6346	351.8728	423.9332	430.1218	422.8632	423.4953	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1658.0008	1600.0975	1441.0098	1183.0535	912.2709	605.8016	393.8010	411.7996	649.4024	990.4526	1332.8012	1627.4344	(97)
Space heating kWh	907.7282	751.2526	693.9344	461.5263	277.6565	0.0000	0.0000	0.0000	0.0000	416.8861	655.1554	895.7307	(98a)
Space heating requirement - total per year (kWh/year)												5059.8702	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	907.7282	751.2526	693.9344	461.5263	277.6565	0.0000	0.0000	0.0000	0.0000	416.8861	655.1554	895.7307	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5059.8702	
Space heating per m2											(98c) / (4) =	89.0979	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	907.7282	751.2526	693.9344	461.5263	277.6565	0.0000	0.0000	0.0000	0.0000	416.8861	655.1554	895.7307	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	907.7282	751.2526	693.9344	461.5263	277.6565	0.0000	0.0000	0.0000	0.0000	416.8861	655.1554	895.7307	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7794	14.2633	12.8425	9.4090	7.2678	5.9378	6.6299	8.6178	11.1937	14.6867	16.5886	18.2736	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5059.8702	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1737.6031	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	143.4902	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6940.9636	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5059.8702	0.1539	778.6101	(261)
Total CO2 associated with community systems			0.0000	(373)

Water heating (other fuel)	1737.6031	0.1412	245.2846	(264)
Space and water heating			1023.8947	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.4902	0.1443	20.7101	(268)
Total CO2, kg/year			1044.6048	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			18.3900	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	5059.8702	1.5697	7942.5064	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1737.6031	1.5220	2644.5990	(278)
Space and water heating			10587.1054	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	143.4902	1.5338	220.0901	(282)
Total Primary energy kWh/year			10807.1955	(286)
Dwelling Primary energy Rate (DPER)			190.3000	(287)

Full SAP Calculation Printout

Property Reference	Apt. 2	Issued on Date	01/10/2024
Assessment Reference	Apt. 2	Prop Type Ref	
Property			

SAP Rating	37 F	DER	18.39	TER	
Environmental	87 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.99	DFEE	96.31	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	190.30	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.7900	(1b)	x 3.1000	(2b) =	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		176.0490	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8636 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9359	0.9176	0.8992	0.8075	0.7891	0.6974	0.6974	0.6790	0.7341	0.7891	0.8258	0.8625	(22b)
Effective ac	0.9380	0.9210	0.9043	0.8260	0.8114	0.7432	0.7432	0.7305	0.7694	0.8114	0.8410	0.8720	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			1.3600	1.3258	1.8030			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			5.3600	2.7580	14.7829			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Corridor Wall	17.2100	2.1000	15.1100	0.1800	2.7198			(29a)
Total net area of external elements Aum(A, m2)			125.5500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		49.8922			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		25.1100 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	75.0022 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4933	53.5052	52.5367	47.9877	47.1366	43.1745	43.1745	42.4408	44.7006	47.1366	48.8584	50.6584	(38)
Heat transfer coeff	129.4955	128.5075	127.5390	122.9899	122.1388	118.1768	118.1768	117.4431	119.7029	122.1388	123.8606	125.6606	(39)

Average = Sum(39)m / 12 = 122.9859

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2803	2.2629	2.2458	2.1657	2.1507	2.0809	2.0809	2.0680	2.1078	2.1507	2.1810	2.2127	(40)
HLP (average)												2.1656	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8896 (42)

Hot water usage for mixer showers

62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)

Average daily hot water use (litres/day) 88.7832 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)											Total = Sum(45)m =	1474.8031	
Distribution loss (46)m = 0.15 x (45)m													
	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
											Total per year (kWh/year) = Sum(64)m =	1737.6031	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.8161	60.9154	64.8626	57.3881	55.8752	50.6164	50.1498	51.9892	52.3923	58.1026	61.3927	68.1118	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.3125	18.0414	14.6723	11.1078	8.3032	7.0099	7.5745	9.8456	13.2148	16.7792	19.5838	20.8771	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	245.9478	248.5000	242.0686	228.3770	211.0937	194.8499	183.9980	181.4459	187.8772	201.5689	218.8522	235.0960	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	92.4948	90.6479	87.1809	79.7057	75.1010	70.3005	67.4056	69.8780	72.7671	78.0949	85.2676	91.5481	(72)
Total internal gains													
	444.7738	443.2080	429.9404	405.2091	380.5166	358.1791	344.9968	347.1881	359.8778	382.4616	409.7222	433.5398	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Northeast	5.3600	11.2829	0.7600	0.7000	0.7700	22.2963	(75)

Solar gains	43.3801	81.2983	130.9074	195.1729	248.7056	260.1451	245.2986	203.3370	152.8433	95.1559	53.3081	36.2517	(83)
Total gains	488.1540	524.5064	560.8478	600.3821	629.2222	618.3242	590.2954	550.5251	512.7211	477.6175	463.0303	469.7914	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	30.4547	30.6889	30.9219	32.0656	32.2891	33.3716	33.3716	33.5801	32.9462	32.2891	31.8402	31.3841	
alpha	3.0303	3.0459	3.0615	3.1377	3.1526	3.2248	3.2248	3.2387	3.1964	3.1526	3.1227	3.0923	
util living area													
	0.9915	0.9885	0.9818	0.9646	0.9242	0.8337	0.7128	0.7568	0.9045	0.9709	0.9878	0.9925	(86)
MIT	18.3724	18.5666	18.9565	19.5520	20.1149	20.6113	20.8399	20.8001	20.4179	19.7123	18.9909	18.3987	(87)
Th 2	19.1530	19.1639	19.1745	19.2252	19.2348	19.2799	19.2799	19.2884	19.2624	19.2348	19.2154	19.1953	(88)
util rest of house													
	0.9883	0.9841	0.9741	0.9474	0.8798	0.7191	0.5005	0.5596	0.8274	0.9532	0.9823	0.9897	(89)
MIT 2	16.2586	16.5118	17.0137	17.7921	18.4835	19.0554	19.2359	19.2238	18.8628	18.0068	17.0828	16.3149	(90)

Living area fraction										fLA = Living area / (4) =		0.4363	(91)
MIT	17.1810	17.4084	17.8614	18.5600	19.1954	19.7343	19.9358	19.9116	19.5414	18.7510	17.9154	17.2242	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.1810	17.4084	17.8614	18.5600	19.1954	19.7343	19.9358	19.9116	19.5414	18.7510	17.9154	17.2242	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9828	0.9775	0.9657	0.9382	0.8785	0.7560	0.5941	0.6447	0.8437	0.9461	0.9760	0.9849	(94)
Useful gains	479.7564	512.7183	541.6374	563.2937	552.7827	467.4806	350.6907	354.9117	432.5834	451.8704	451.9079	462.6883	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1668.0275	1607.4225	1449.0207	1188.0832	915.4752	606.7579	394.2164	412.4134	651.3473	995.5549	1339.5985	1636.6293	(97)
Space heating kWh													
	884.0737	735.6412	675.0932	449.8484	269.8432	0.0000	0.0000	0.0000	0.0000	404.5013	639.1373	873.4121	(98a)
Space heating requirement - total per year (kWh/year)												4931.5503	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	884.0737	735.6412	675.0932	449.8484	269.8432	0.0000	0.0000	0.0000	0.0000	404.5013	639.1373	873.4121	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4931.5503	
Space heating per m2											(98c) / (4) =	86.8384	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	884.0737	735.6412	675.0932	449.8484	269.8432	0.0000	0.0000	0.0000	0.0000	404.5013	639.1373	873.4121	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	884.0737	735.6412	675.0932	449.8484	269.8432	0.0000	0.0000	0.0000	0.0000	404.5013	639.1373	873.4121	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7794	14.2633	12.8425	9.4090	7.2678	5.9378	6.6299	8.6178	11.1937	14.6867	16.5886	18.2736	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4931.5503	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1737.6031	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	143.4902	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6812.6437	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4931.5503	16.4900	813.2126	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1737.6031	16.4900	286.5308	(247)

Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	143.4902	16.4900	23.6615	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1123.4049	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.9731	(257)
SAP value		36.6044	
SAP rating (Section 12)		37	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4931.5503	0.1539	758.9316	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1737.6031	0.1412	245.2846	(264)
Space and water heating			1004.2162	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.4902	0.1443	20.7101	(268)
Total CO2, kg/year			1024.9262	(272)
CO2 emissions per m2			18.0500	(273)
EI value			86.5075	
EI rating			87	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		56.7900	(1b)	x 3.1000	(2b) =	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		176.0490	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8636	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8809	0.8625	0.8442	0.7708	0.7524	0.6790	0.6790	0.6790	0.6790	0.7708	0.7891	0.8258	(22b)
Effective ac	0.8880	0.8720	0.8563	0.7970	0.7831	0.7305	0.7305	0.7305	0.7305	0.7970	0.8114	0.8410	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			1.3600	1.3258	1.8030			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			5.3600	2.7580	14.7829			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Corridor Wall	17.2100	2.1000	15.1100	0.1800	2.7198			(29a)
Total net area of external elements Aum(A, m2)			125.5500					(31)

Fabric heat loss, W/K = Sum (A x U) (26)...(30) + (32) = 49.8922 (33)
Party Ceiling 1 56.7900 (32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area) 25.1100 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 75.0022 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.5878	50.6584	49.7486	46.3050	45.4931	42.4408	42.4408	42.4408	42.4408	46.3050	47.1366	48.8584	(38)
Heat transfer coeff	126.5900	125.6606	124.7508	121.3073	120.4953	117.4431	117.4431	117.4431	117.4431	121.3073	122.1388	123.8606	(39)
Average = Sum(39)m / 12 =												121.3236	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2291	2.2127	2.1967	2.1361	2.1218	2.0680	2.0680	2.0680	2.0680	2.1361	2.1507	2.1810	(40)
HLP (average)												2.1364	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8896 (42)

Hot water usage for mixer showers	62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504 (42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses	33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812 (42c)
Average daily hot water use (litres/day)												88.7832 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)										Total = Sum(45)m =		1474.8031	
Distribution loss (46)m = 0.15 x (45)m	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
									Total per year (kWh/year) = Sum(64)m =			1737.6031	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month	68.8161	60.9154	64.8626	57.3881	55.8752	50.6164	50.1498	51.9892	52.3923	58.1026	61.3927	68.1118	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.3125	18.0414	14.6723	11.1078	8.3032	7.0099	7.5745	9.8456	13.2148	16.7792	19.5838	20.8771	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	245.9478	248.5000	242.0686	228.3770	211.0937	194.8499	183.9980	181.4459	187.8772	201.5689	218.8522	235.0960	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)	92.4948	90.6479	87.1809	79.7057	75.1010	70.3005	67.4056	69.8780	72.7671	78.0949	85.2676	91.5481	(72)
Total internal gains	444.7738	443.2080	429.9404	405.2091	380.5166	358.1791	344.9968	347.1881	359.8778	382.4616	409.7222	433.5398	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)
Northeast	5.3600	10.4150	0.7600	0.7000	0.7700	20.5812	(75)

Solar gains	40.0432	76.7818	129.5438	197.7753	247.4102	264.0473	241.4050	196.8613	152.8433	93.7142	50.0773	34.5254	(83)
Total gains	484.8170	519.9898	559.4842	602.9844	627.9269	622.2264	586.4017	544.0494	512.7211	476.1758	459.7995	468.0652	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	31.1537	31.3841	31.6130	32.5104	32.7295	33.5801	33.5801	33.5801	33.5801	32.5104	32.2891	31.8402	
alpha	3.0769	3.0923	3.1075	3.1674	3.1820	3.2387	3.2387	3.2387	3.2387	3.1674	3.1526	3.1227	
util living area													
	0.9911	0.9882	0.9811	0.9623	0.9176	0.8255	0.7319	0.7696	0.9026	0.9703	0.9871	0.9921	(86)
MIT	18.5029	18.6727	19.0421	19.6186	20.1849	20.6341	20.8204	20.7844	20.4379	19.7400	19.0920	18.5099	(87)
Th 2	19.1850	19.1953	19.2054	19.2442	19.2534	19.2884	19.2884	19.2884	19.2884	19.2442	19.2348	19.2154	(88)
util rest of house													
	0.9877	0.9836	0.9731	0.9439	0.8688	0.7065	0.5325	0.5795	0.8253	0.9521	0.9810	0.9891	(89)
MIT 2	16.4425	16.6643	17.1393	17.8860	18.5774	19.0824	19.2325	19.2143	18.9020	18.0469	17.2225	16.4680	(90)
Living area fraction											fLA = Living area / (4) =	0.4363	(91)
MIT	17.3415	17.5407	17.9696	18.6420	19.2788	19.7595	19.9253	19.8994	19.5722	18.7856	18.0382	17.3589	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.3415	17.5407	17.9696	18.6420	19.2788	19.7595	19.9253	19.8994	19.5722	18.7856	18.0382	17.3589	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9822	0.9771	0.9648	0.9350	0.8697	0.7462	0.6189	0.6605	0.8421	0.9451	0.9746	0.9841	(94)
Useful gains	476.1785	508.0724	539.8111	563.7825	546.1029	464.2914	362.9174	359.3360	431.7670	450.0499	448.1226	460.6435	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1600.2888	1550.7386	1405.8898	1157.5165	877.0641	594.2005	414.0267	422.7285	642.6711	980.8459	1287.1282	1580.3287	(97)
Space heating kWh													
	836.3380	700.6717	644.3625	427.4885	246.2351	0.0000	0.0000	0.0000	0.0000	394.9122	604.0841	833.0458	(98a)
Space heating requirement - total per year (kWh/year)												4687.1379	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	836.3380	700.6717	644.3625	427.4885	246.2351	0.0000	0.0000	0.0000	0.0000	394.9122	604.0841	833.0458	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4687.1379	
Space heating per m2											(98c) / (4) =	82.5346	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	836.3380	700.6717	644.3625	427.4885	246.2351	0.0000	0.0000	0.0000	0.0000	394.9122	604.0841	833.0458	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	836.3380	700.6717	644.3625	427.4885	246.2351	0.0000	0.0000	0.0000	0.0000	394.9122	604.0841	833.0458	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7794	14.2633	12.8425	9.4090	7.2678	5.9378	6.6299	8.6178	11.1937	14.6867	16.5886	18.2736	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4687.1379	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1737.6031	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												143.4902	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)

Energy used		0.0000 (237)
Total delivered energy for all uses		6568.2313 (238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4687.1379	26.0600	1221.4681	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1737.6031	26.0600	452.8194	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	143.4902	26.0600	37.3936	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1711.6811	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4687.1379	0.1539	721.3631	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1737.6031	0.1412	245.2846	(264)
Space and water heating			966.6477	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.4902	0.1443	20.7101	(268)
Total CO2, kg/year			987.3578	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4687.1379	1.5698	7357.8693	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1737.6031	1.5220	2644.5990	(278)
Space and water heating			10002.4683	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	143.4902	1.5338	220.0901	(282)
Total Primary energy kWh/year			10222.5584	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 2

Current energy efficiency rating: F 37
Current environmental impact rating: B 87

N	Solar water heating		Not applicable
U	Solar photovoltaic panels		Not applicable
V2	Wind turbine		Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings		Energy efficiency	Environmental impact
(none)				
Total Savings	£0	0.00 kg/m²		

Potential energy efficiency rating: F 37
Potential environmental impact rating: B 87

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£1712	£1712	£0
Space heating	£1221	£1221	£0
Water heating	£453	£453	£0
Lighting	£37	£37	£0
Total cost of fuels	£1712	£1712	£0
Total cost of uses	£1711	£1711	£0
Delivered energy	116 kWh/m²	116 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.0 tonnes	1.0 tonnes	0.0 tonnes
CO2 emissions per m²	17 kg/m²	17 kg/m²	0 kg/m²
Primary energy	180 kWh/m²	180 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.7900 (1b)	x	3.1000 (2b)	=	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	176.0490	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8636	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9359	0.9176	0.8992	0.8075	0.7891	0.6974	0.6974	0.6790	0.7341	0.7891	0.8258	0.8625	(22b)
Effective ac	0.9380	0.9210	0.9043	0.8260	0.8114	0.7432	0.7432	0.7305	0.7694	0.8114	0.8410	0.8720	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			1.3600	1.3258	1.8030			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			5.3600	2.7580	14.7829			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Corridor Wall	17.2100	2.1000	15.1100	0.1800	2.7198			(29a)
Total net area of external elements Aum(A, m2)			125.5500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		49.8922			(33)
Party Ceiling 1			56.7900					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							25.1100	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		75.0022	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4933	53.5052	52.5367	47.9877	47.1366	43.1745	43.1745	42.4408	44.7006	47.1366	48.8584	50.6584	(38)
Heat transfer coeff	129.4955	128.5075	127.5390	122.9899	122.1388	118.1768	118.1768	117.4431	119.7029	122.1388	123.8606	125.6606	(39)
Average = Sum(39)m / 12 =												122.9859	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2803	2.2629	2.2458	2.1657	2.1507	2.0809	2.0809	2.0680	2.1078	2.1507	2.1810	2.2127	(40)
HLP (average)												2.1656	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy											1.8896	(42)
Hot water usage for mixer showers	62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)
Average daily hot water use (litres/day)												88.7832	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)										Total = Sum(45)m =		1474.8031	
Distribution loss (46)m = 0.15 x (45)m	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)

Total per year (kWh/year) = Sum(64)m = 1737.6031 (64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

68.8161	60.9154	64.8626	57.3881	55.8752	50.6164	50.1498	51.9892	52.3923	58.1026	61.3927	68.1118	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

20.3125	18.0414	14.6723	11.1078	8.3032	7.0099	7.5745	9.8456	13.2148	16.7792	19.5838	20.8771	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

245.9478	248.5000	242.0686	228.3770	211.0937	194.8499	183.9980	181.4459	187.8772	201.5689	218.8522	235.0960	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	(69)
Pumps, fans 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)

Water heating gains (Table 5)

92.4948	90.6479	87.1809	79.7057	75.1010	70.3005	67.4056	69.8780	72.7671	78.0949	85.2676	91.5481	(72)

Total internal gains

444.7738	443.2080	429.9404	405.2091	380.5166	358.1791	344.9968	347.1881	359.8778	382.4616	409.7222	433.5398	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Northeast	5.3600	11.2829	0.7600	0.7000	0.7700	22.2963	(75)

Solar gains	43.3801	81.2983	130.9074	195.1729	248.7056	260.1451	245.2986	203.3370	152.8433	95.1559	53.3081	36.2517	(83)
Total gains	488.1540	524.5064	560.8478	600.3821	629.2222	618.3242	590.2954	550.5251	512.7211	477.6175	463.0303	469.7914	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	30.4547	30.6889	30.9219	32.0656	32.2891	33.3716	33.3716	33.5801	32.9462	32.2891	31.8402	31.3841	
alpha	3.0303	3.0459	3.0615	3.1377	3.1526	3.2248	3.2248	3.2387	3.1964	3.1526	3.1227	3.0923	
util living area	0.9915	0.9885	0.9818	0.9646	0.9242	0.8337	0.7128	0.7568	0.9045	0.9709	0.9878	0.9925	(86)
MIT	18.3724	18.5666	18.9565	19.5520	20.1149	20.6113	20.8399	20.8001	20.4179	19.7123	18.9909	18.3987	(87)
Th 2	19.1530	19.1639	19.1745	19.2252	19.2348	19.2799	19.2799	19.2884	19.2624	19.2348	19.2154	19.1953	(88)
util rest of house	0.9883	0.9841	0.9741	0.9474	0.8798	0.7191	0.5005	0.5596	0.8274	0.9532	0.9823	0.9897	(89)
MIT 2	16.2586	16.5118	17.0137	17.7921	18.4835	19.0554	19.2359	19.2238	18.8628	18.0068	17.0828	16.3149	(90)
Living area fraction									fLA = Living area / (4) =			0.4363	(91)
MIT	17.1810	17.4084	17.8614	18.5600	19.1954	19.7343	19.9358	19.9116	19.5414	18.7510	17.9154	17.2242	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.1810	17.4084	17.8614	18.5600	19.1954	19.7343	19.9358	19.9116	19.5414	18.7510	17.9154	17.2242	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9828	0.9775	0.9657	0.9382	0.8785	0.7560	0.5941	0.6447	0.8437	0.9461	0.9760	0.9849	(94)
Useful gains	479.7564	512.7183	541.6374	563.2937	552.7827	467.4806	350.6907	354.9117	432.5834	451.8704	451.9079	462.6883	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1668.0275	1607.4225	1449.0207	1188.0832	915.4752	606.7579	394.2164	412.4134	651.3473	995.5549	1339.5985	1636.6293	(97)
Space heating kWh	884.0737	735.6412	675.0932	449.8484	269.8432	0.0000	0.0000	0.0000	0.0000	404.5013	639.1373	873.4121	(98a)

Space heating requirement - total per year (kWh/year) 4931.5503

Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh	884.0737	735.6412	675.0932	449.8484	269.8432	0.0000	0.0000	0.0000	0.0000	404.5013	639.1373	873.4121	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 4931.5503

Space heating per m2 (98c) / (4) = 86.8384 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	884.0737	735.6412	675.0932	449.8484	269.8432	0.0000	0.0000	0.0000	0.0000	404.5013	639.1373	873.4121	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	884.0737	735.6412	675.0932	449.8484	269.8432	0.0000	0.0000	0.0000	0.0000	404.5013	639.1373	873.4121	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7794	14.2633	12.8425	9.4090	7.2678	5.9378	6.6299	8.6178	11.1937	14.6867	16.5886	18.2736	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4931.5503	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1737.6031	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												143.4902	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												6812.6437	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4931.5503	16.4900	813.2126	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1737.6031	16.4900	286.5308	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	143.4902	16.4900	23.6615	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1123.4049	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.9731	(257)
SAP value		36.6044	
SAP rating (Section 12)		37	(258)
SAP band		F	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4931.5503	0.1539	758.9316	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1737.6031	0.1412	245.2846	(264)
Space and water heating			1004.2162	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.4902	0.1443	20.7101	(268)
Total CO2, kg/year			1024.9262	(272)
CO2 emissions per m2			18.0500	(273)
EI value			86.5075	
EI rating			87	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.7900 (1b)	x	3.1000 (2b)	=	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	176.0490	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8636	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8809	0.8625	0.8442	0.7708	0.7524	0.6790	0.6790	0.6790	0.6790	0.7708	0.7891	0.8258	(22b)
Effective ac	0.8880	0.8720	0.8563	0.7970	0.7831	0.7305	0.7305	0.7305	0.7305	0.7970	0.8114	0.8410	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			1.3600	1.3258	1.8030			(27)
New Door			2.1000	1.4000	2.9400			(26)
Existing Glazing (Uw = 3.10)			5.3600	2.7580	14.7829			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Corridor Wall	17.2100	2.1000	15.1100	0.1800	2.7198			(29a)
Total net area of external elements Aum(A, m2)			125.5500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		49.8922			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	25.1100	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	75.0022	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.5878	50.6584	49.7486	46.3050	45.4931	42.4408	42.4408	42.4408	42.4408	46.3050	47.1366	48.8584	(38)
Heat transfer coeff	126.5900	125.6606	124.7508	121.3073	120.4953	117.4431	117.4431	117.4431	117.4431	121.3073	122.1388	123.8606	(39)
Average = Sum(39)m / 12 =												121.3236	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.2291	2.2127	2.1967	2.1361	2.1218	2.0680	2.0680	2.0680	2.0680	2.1361	2.1507	2.1810	(40)
HLP (average)												2.1364	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.8896	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)
Average daily hot water use (litres/day)												88.7832	(43)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Daily hot water use

	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)											Total = Sum(45)m =	1474.8031	

Distribution loss (46)m = 0.15 x (45)m

	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)

Water storage loss:

Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)

Total storage loss

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
										Total per year (kWh/year) = Sum(64)m =		1737.6031	(64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)

Heat gains from water heating, kWh/month

	68.8161	60.9154	64.8626	57.3881	55.8752	50.6164	50.1498	51.9892	52.3923	58.1026	61.3927	68.1118	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	20.3125	18.0414	14.6723	11.1078	8.3032	7.0099	7.5745	9.8456	13.2148	16.7792	19.5838	20.8771	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	245.9478	248.5000	242.0686	228.3770	211.0937	194.8499	183.9980	181.4459	187.8772	201.5689	218.8522	235.0960	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)

Water heating gains (Table 5)

	92.4948	90.6479	87.1809	79.7057	75.1010	70.3005	67.4056	69.8780	72.7671	78.0949	85.2676	91.5481	(72)

Total internal gains

	444.7738	443.2080	429.9404	405.2091	380.5166	358.1791	344.9968	347.1881	359.8778	382.4616	409.7222	433.5398	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)
Northeast	5.3600	10.4150	0.7600	0.7000	0.7700	20.5812	(75)

Solar gains	40.0432	76.7818	129.5438	197.7753	247.4102	264.0473	241.4050	196.8613	152.8433	93.7142	50.0773	34.5254	(83)
Total gains	484.8170	519.9898	559.4842	602.9844	627.9269	622.2264	586.4017	544.0494	512.7211	476.1758	459.7995	468.0652	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	31.1537	31.3841	31.6130	32.5104	32.7295	33.5801	33.5801	33.5801	33.5801	32.5104	32.2891	31.8402	
alpha	3.0769	3.0923	3.1075	3.1674	3.1820	3.2387	3.2387	3.2387	3.2387	3.1674	3.1526	3.1227	
util living area													
	0.9911	0.9882	0.9811	0.9623	0.9176	0.8255	0.7319	0.7696	0.9026	0.9703	0.9871	0.9921	(86)
MIT	18.5029	18.6727	19.0421	19.6186	20.1849	20.6341	20.8204	20.7844	20.4379	19.7400	19.0920	18.5099	(87)
Th 2	19.1850	19.1953	19.2054	19.2442	19.2534	19.2884	19.2884	19.2884	19.2884	19.2442	19.2348	19.2154	(88)
util rest of house													
	0.9877	0.9836	0.9731	0.9439	0.8688	0.7065	0.5325	0.5795	0.8253	0.9521	0.9810	0.9891	(89)
MIT 2	16.4425	16.6643	17.1393	17.8860	18.5774	19.0824	19.2325	19.2143	18.9020	18.0469	17.2225	16.4680	(90)
Living area fraction										fLA = Living area / (4) =		0.4363	(91)
MIT	17.3415	17.5407	17.9696	18.6420	19.2788	19.7595	19.9253	19.8994	19.5722	18.7856	18.0382	17.3589	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.3415	17.5407	17.9696	18.6420	19.2788	19.7595	19.9253	19.8994	19.5722	18.7856	18.0382	17.3589	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9822	0.9771	0.9648	0.9350	0.8697	0.7462	0.6189	0.6605	0.8421	0.9451	0.9746	0.9841	(94)
Useful gains	476.1785	508.0724	539.8111	563.7825	546.1029	464.2914	362.9174	359.3360	431.7670	450.0499	448.1226	460.6435	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1600.2888	1550.7386	1405.8898	1157.5165	877.0641	594.2005	414.0267	422.7285	642.6711	980.8459	1287.1282	1580.3287	(97)
Space heating kWh													
	836.3380	700.6717	644.3625	427.4885	246.2351	0.0000	0.0000	0.0000	0.0000	394.9122	604.0841	833.0458	(98a)
Space heating requirement - total per year (kWh/year)												4687.1379	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	

Space heating kWh

836.3380	700.6717	644.3625	427.4885	246.2351	0.0000	0.0000	0.0000	0.0000	394.9122	604.0841	833.0458	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 4687.1379

Space heating per m2 (98c) / (4) = 82.5346 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	836.3380	700.6717	644.3625	427.4885	246.2351	0.0000	0.0000	0.0000	0.0000	394.9122	604.0841	833.0458	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	836.3380	700.6717	644.3625	427.4885	246.2351	0.0000	0.0000	0.0000	0.0000	394.9122	604.0841	833.0458	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	175.5835	154.8590	163.6931	142.2258	136.6633	121.8598	119.4441	124.9763	127.2010	143.3623	154.2697	173.4652	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7794	14.2633	12.8425	9.4090	7.2678	5.9378	6.6299	8.6178	11.1937	14.6867	16.5886	18.2736	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 4687.1379 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 1737.6031 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 143.4902 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N) 0.0000 (235a)

Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated -0.0000 (236)

Energy used 0.0000 (237)

Total delivered energy for all uses 6568.2313 (238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4687.1379	26.0600	1221.4681	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1737.6031	26.0600	452.8194	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	143.4902	26.0600	37.3936	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1711.6811	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4687.1379	0.1539	721.3631	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1737.6031	0.1412	245.2846	(264)
Space and water heating			966.6477	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.4902	0.1443	20.7101	(268)
Total CO2, kg/year			987.3578	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4687.1379	1.5698	7357.8693	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1737.6031	1.5220	2644.5990	(278)
Space and water heating			10002.4683	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	143.4902	1.5338	220.0901	(282)
Total Primary energy kWh/year			10222.5584	(286)

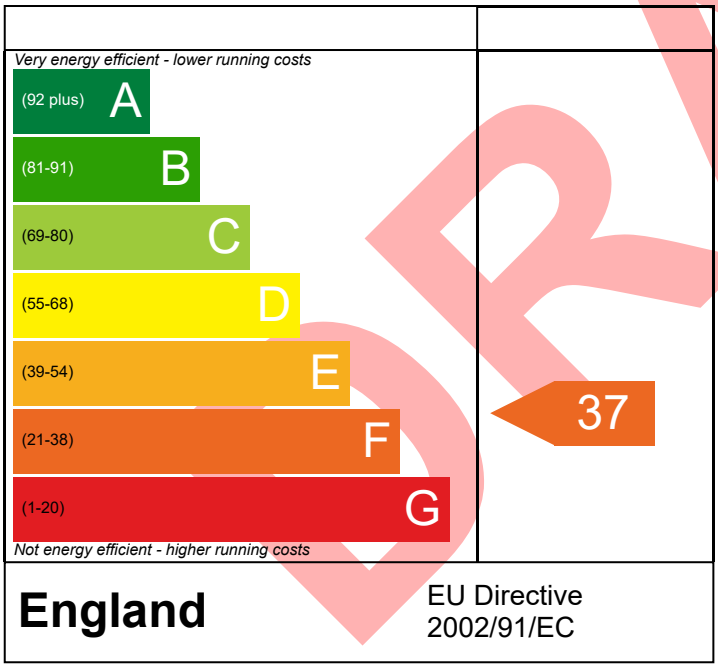
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	56.79 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

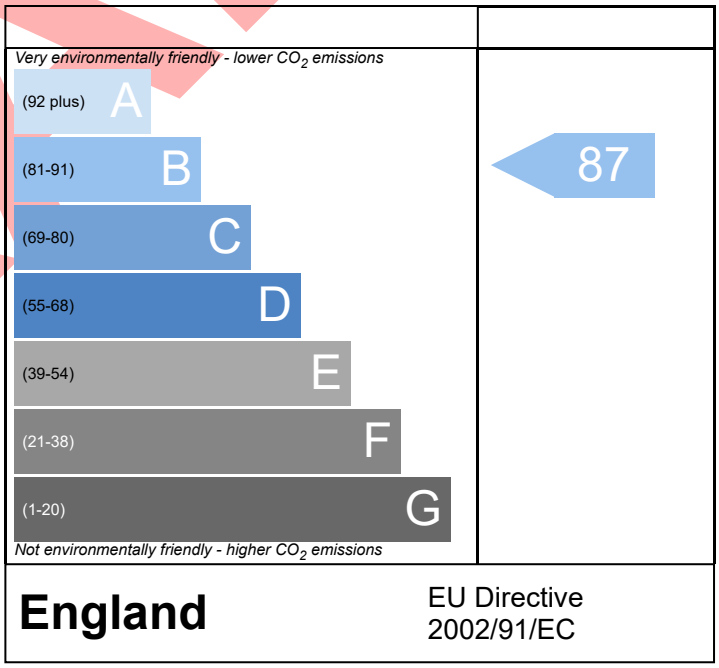
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

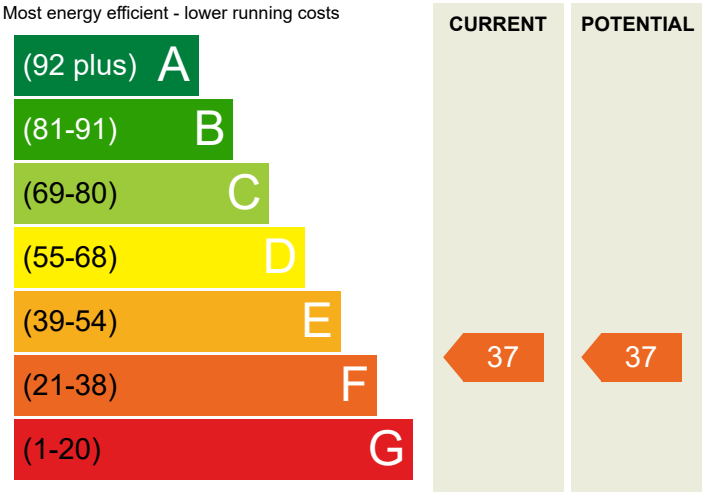
Energy Report

Dwelling Address	
Reference	Apt. 2-Apt. 2
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	57

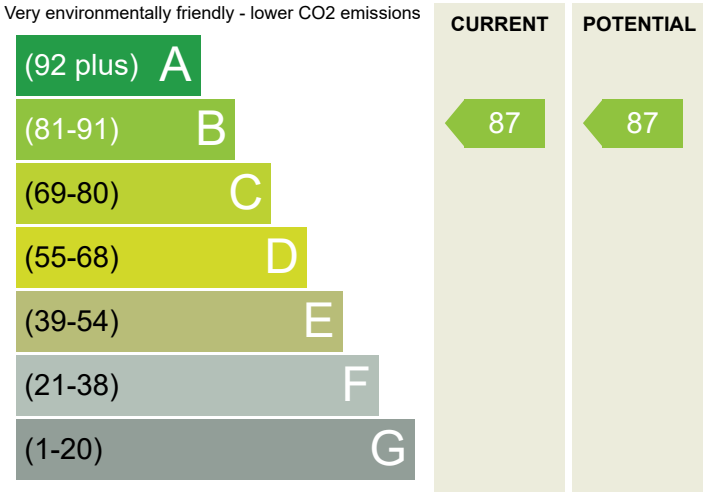
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

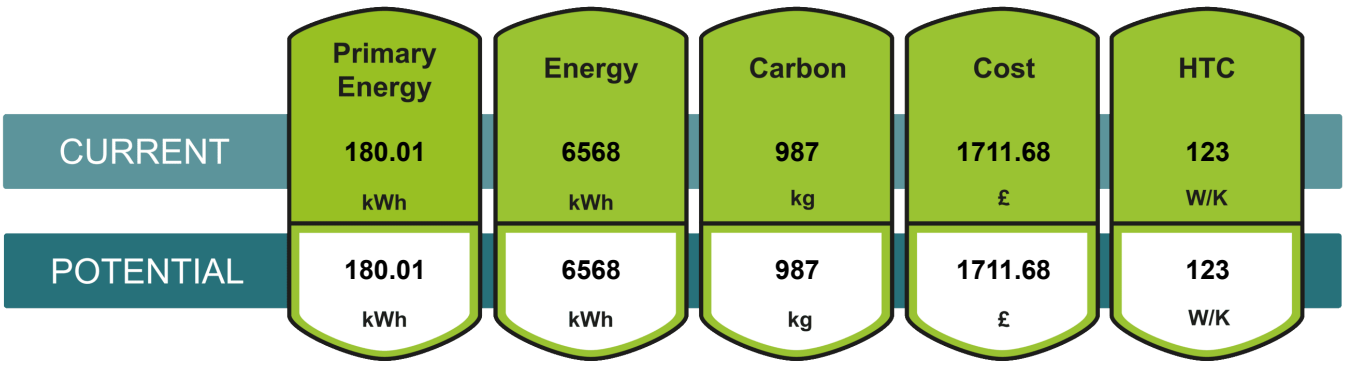
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.27 W/m²K	Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	Fully double glazed	Poor
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£37	£37	You could save £0
Heating	£1221	£1221	
Hot Water	£453	£453	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1712	£1712	

Estimated energy use and potential savings

Space Heating
4687
kWh per year

Water Heating
1738
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 2	Issued on Date	01/10/2024
Assessment Reference	Apt. 2	Prop Type Ref	Detached Flat
Property			

SAP Rating	37 F	DER	18.39	TER	
Environmental	87 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.99	DFEE	96.31	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	190.30	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	51.55	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	17.21	m²	

Comments

Heat Loss Floors

Description	Heatloss Floor 1		
Type	Ground Floor - Timber		
Construction	Other		
U-value	0.25	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	56.79	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NE1	Existing Glazing	External Wall 1	North East	5.36
W SE1	New Glazing	External Wall 1	South East	1.36
D NW	New Door	Corridor Wall	North West	2.10

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	100.00	10.00	1000.00	10

Comments

Main Heating 1

Fuel Type	SAP table	
Winter Efficiency	Electricity	
Summer Efficiency		%
Model Name		%
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue		
Heat Emitter	No	

Flow Temperature	
Flow Temperature Value	

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	Hot Water Cylinder	
Independent Time Control	No	
Cylinder Stat	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day
Pipes insulation		

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 3	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 3	**Prop Type Ref**	
Property			

SAP Rating	43 E	**DER**	16.75	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.84	**DFEE**	84.23	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	173.42	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.23 m	53.41 m²	3.10 m

8.0 Living Area	24.14	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	44.93	38.21	0.00	None	6.72	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	20.89	18.79	0.00	None	2.10	Enter Gross Area

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	53.41

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Other	0.25	None	0.00	0.00	53.41

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SW1	New Glazing	External Wall 1	South West	5.36	0

Summary for Input Data

elmhurst energy

W SE1	New Glazing	External Wall 1	South East	1.36	0
D NW	New Door	Corridor Wall	North West	2.10	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	100.00	10.00	1000.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	

Summary for Input Data

SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 3	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 3	**Prop Type Ref**	
Property			

SAP Rating	43 E	**DER**	16.75	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.84	**DFEE**	84.23	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	173.42	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	53.4100	(1b)	x 3.1000	(2b) =	165.5710	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		165.5710	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8708 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9437	0.9252	0.9067	0.8142	0.7957	0.7032	0.7032	0.6847	0.7402	0.7957	0.8327	0.8697	(22b)
Effective ac	0.9453	0.9280	0.9111	0.8315	0.8166	0.7472	0.7472	0.7344	0.7739	0.8166	0.8467	0.8782	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
Total net area of external elements Aum(A, m2)			119.2300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		40.0468			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.8460	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	63.8928	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.6501	50.7053	49.7792	45.4294	44.6155	40.8270	40.8270	40.1254	42.2863	44.6155	46.2619	47.9831	(38)
Heat transfer coeff	115.5429	114.5981	113.6720	109.3222	108.5083	104.7198	104.7198	104.0182	106.1791	108.5083	110.1547	111.8759	(39)
Average = Sum(39)m / 12 =												109.3183	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.1633	2.1456	2.1283	2.0468	2.0316	1.9607	1.9607	1.9475	1.9880	2.0316	2.0624	2.0947	(40)
HLP (average)												2.0468	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7906	(42)
Hot water usage for mixer showers													
	60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												86.1372	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m													
	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
										Total per year (kWh/year) = Sum(64)m =		1693.6492	(64)
12Total per year (kWh/year)												1694	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	67.2973	59.5806	63.4616	56.1927	54.7421	49.6229	49.1873	50.9719	51.3459	56.9031	60.0780	66.6140	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	83.9693	92.9660	83.9693	86.7683	83.9693	86.7683	83.9693	83.9693	86.7683	83.9693	86.7683	83.9693	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	156.0792	157.6988	153.6174	144.9286	133.9606	123.6523	116.7656	115.1460	119.2274	127.9162	138.8842	149.1925	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	90.4534	88.6616	85.2979	78.0455	73.5780	68.9206	66.1120	68.5107	71.3137	76.4827	83.4416	89.5349	(72)
Total internal gains													
	380.3615	389.1860	372.7442	359.6020	341.3676	329.2008	316.7065	317.4856	327.1690	338.2277	358.9537	372.5564	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	5.3600	36.7938	0.7600	0.8000	0.7700	83.0953	(79)

Solar gains	104.1792	177.4558	242.8027	300.8443	336.9707	334.5339	322.5264	295.5745	262.9040	196.1264	124.7827	89.1557	(83)
Total gains	484.5407	566.6418	615.5469	660.4463	678.3383	663.7347	639.2329	613.0601	590.0730	534.3542	483.7364	461.7121	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	32.1009	32.3655	32.6292	33.9275	34.1820	35.4186	35.4186	35.6575	34.9318	34.1820	33.6711	33.1530	
alpha	3.1401	3.1577	3.1753	3.2618	3.2788	3.3612	3.3612	3.3772	3.3288	3.2788	3.2447	3.2102	
util living area													
	0.9902	0.9832	0.9721	0.9452	0.8909	0.7744	0.6327	0.6684	0.8443	0.9527	0.9836	0.9917	(86)
MIT	18.5436	18.8119	19.2115	19.7948	20.3000	20.7269	20.9015	20.8796	20.5918	19.9288	19.1837	18.5655	(87)
Th 2	19.2267	19.2380	19.2492	19.3023	19.3123	19.3597	19.3597	19.3685	19.3413	19.3123	19.2920	19.2710	(88)
util rest of house													
	0.9866	0.9770	0.9610	0.9210	0.8354	0.6508	0.4344	0.4777	0.7460	0.9266	0.9764	0.9886	(89)
MIT 2	16.5163	16.8628	17.3743	18.1313	18.7369	19.2105	19.3342	19.3328	19.0814	18.3133	17.3692	16.5690	(90)

Living area fraction											fLA = Living area / (4) =	0.4520	(91)
MIT	17.4326	17.7438	18.2047	18.8832	19.4434	19.8959	20.0426	20.0319	19.7641	19.0435	18.1893	17.4714	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4326	17.7438	18.2047	18.8832	19.4434	19.8959	20.0426	20.0319	19.7641	19.0435	18.1893	17.4714	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9809	0.9692	0.9516	0.9131	0.8408	0.6973	0.5249	0.5638	0.7762	0.9210	0.9695	0.9837	(94)
Useful gains	475.3063	549.2068	585.7390	603.0265	570.3185	462.8023	335.5274	345.6602	458.0427	492.1341	468.9832	454.1730	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1517.3765	1471.8701	1330.4935	1091.3831	840.2230	554.5828	360.5093	377.7833	601.4048	916.1865	1221.5400	1484.7501	(97)
Space heating kWh	775.3002	620.0298	554.0974	351.6168	200.8090	0.0000	0.0000	0.0000	0.0000	315.4950	541.8409	766.7494	(98a)
Space heating requirement - total per year (kWh/year)												4125.9385	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	775.3002	620.0298	554.0974	351.6168	200.8090	0.0000	0.0000	0.0000	0.0000	315.4950	541.8409	766.7494	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4125.9385	
Space heating per m2											(98c) / (4) =	77.2503	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	775.3002	620.0298	554.0974	351.6168	200.8090	0.0000	0.0000	0.0000	0.0000	315.4950	541.8409	766.7494	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	775.3002	620.0298	554.0974	351.6168	200.8090	0.0000	0.0000	0.0000	0.0000	315.4950	541.8409	766.7494	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.2347	13.0241	11.7267	8.5915	6.6363	5.4219	6.0539	7.8691	10.2211	13.4107	15.1473	16.6859	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4125.9385	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1693.6492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	131.0232	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5950.6109	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4125.9385	0.1544	636.8490	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1693.6492	0.1412	239.0608	(264)

Space and water heating			875.9098	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.0232	0.1443	18.9107	(268)
Total CO2, kg/year			894.8205	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			16.7500	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4125.9385	1.5714	6483.6984	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1693.6492	1.5219	2577.6300	(278)
Space and water heating			9061.3284	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	131.0232	1.5338	200.9678	(282)
Total Primary energy kWh/year			9262.2962	(286)
Dwelling Primary energy Rate (DPER)			173.4200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 3	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 3	**Prop Type Ref**	
Property			

SAP Rating	43 E	**DER**	16.75	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.84	**DFEE**	84.23	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	173.42	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	53.4100	(1b)	x 3.1000	(2b) =	165.5710	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		165.5710	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8708	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9437	0.9252	0.9067	0.8142	0.7957	0.7032	0.7032	0.6847	0.7402	0.7957	0.8327	0.8697	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9453	0.9280	0.9111	0.8315	0.8166	0.7472	0.7472	0.7344	0.7739	0.8166	0.8467	0.8782	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
Total net area of external elements Aum(A, m2)			119.2300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		40.0468			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		23.8460	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	63.8928	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.6501	50.7053	49.7792	45.4294	44.6155	40.8270	40.8270	40.1254	42.2863	44.6155	46.2619	47.9831	(38)
Heat transfer coeff													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	115.5429	114.5981	113.6720	109.3222	108.5083	104.7198	104.7198	104.0182	106.1791	108.5083	110.1547	111.8759	(39)
Average = Sum(39)m / 12 =												109.3183	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.1633	2.1456	2.1283	2.0468	2.0316	1.9607	1.9607	1.9475	1.9880	2.0316	2.0624	2.0947	(40)
HLP (average)												2.0468	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.7906 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	23.4494	23.1011	22.6107	21.7064	21.0294	20.2786	19.8730	20.3600	20.8903	21.6936	22.6165	23.3701	(42b)
Hot water usage for other uses	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												51.7121	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	56.4173	54.8702	53.1810	51.0779	49.2020	47.2523	46.8468	48.5326	50.2617	52.2639	54.3856	56.3380	(44)
Energy conte	89.3512	78.1344	81.7372	69.9231	66.2353	58.1023	56.6572	60.0935	61.9777	70.9216	77.4823	88.2117	(45)
Energy content (annual)										Total = Sum(45)m =		858.8275	
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	75.9485	66.4143	69.4766	59.4346	56.3000	49.3869	48.1586	51.0795	52.6811	60.2834	65.8599	74.9800	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	75.9485	66.4143	69.4766	59.4346	56.3000	49.3869	48.1586	51.0795	52.6811	60.2834	65.8599	74.9800	(64)
							Total per year (kWh/year) = Sum(64)m =					730.0034	(64)
12Total per year (kWh/year)												730	(64)
Electric shower(s)	43.4393	38.7048	42.2642	40.3322	41.0890	39.1949	40.5014	41.0890	40.3322	42.2642	41.4694	43.4393	(64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							494.1199	(64a)
Heat gains from water heating, kWh/month	29.8470	26.2798	27.9352	24.9417	24.3472	22.1455	22.1650	23.0421	23.2533	25.6369	26.8323	29.6048	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	83.9693	92.9660	83.9693	86.7683	83.9693	86.7683	83.9693	83.9693	86.7683	83.9693	86.7683	83.9693	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	156.0792	157.6988	153.6174	144.9286	133.9606	123.6523	116.7656	115.1460	119.2274	127.9162	138.8842	149.1925	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)	40.1169	39.1068	37.5473	34.6412	32.7248	30.7576	29.7917	30.9706	32.2963	34.4582	37.2671	39.7914	(72)
Total internal gains	330.0250	339.6312	324.9936	316.1978	300.5144	291.0377	280.3862	279.9455	288.1516	296.2033	312.7792	322.8129	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	5.3600	36.7938	0.7600	0.8000	0.7700	83.0953	(79)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	104.1792	177.4558	242.8027	300.8443	336.9707	334.5339	322.5264	295.5745	262.9040	196.1264	124.7827	89.1557	(83)
Total gains	434.2042	517.0870	567.7963	617.0421	637.4851	625.5717	602.9126	575.5200	551.0555	492.3297	437.5619	411.9686	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	32.1009	32.3655	32.6292	33.9275	34.1820	35.4186	35.4186	35.6575	34.9318	34.1820	33.6711	33.1530	
alpha	3.1401	3.1577	3.1753	3.2618	3.2788	3.3612	3.3612	3.3772	3.3288	3.2788	3.2447	3.2102	
util living area	0.9928	0.9870	0.9775	0.9539	0.9050	0.7965	0.6585	0.6959	0.8645	0.9618	0.9877	0.9940	(86)
MIT	18.4611	18.7324	19.1377	19.7333	20.2526	20.6993	20.8886	20.8633	20.5538	19.8673	19.1086	18.4827	(87)
Th 2	19.2267	19.2380	19.2492	19.3023	19.3123	19.3597	19.3597	19.3685	19.3413	19.3123	19.2920	19.2710	(88)
util rest of house	0.9901	0.9821	0.9683	0.9328	0.8543	0.6768	0.4574	0.5040	0.7728	0.9399	0.9821	0.9918	(89)
MIT 2	17.0329	17.3092	17.7170	18.3333	18.8257	19.2284	19.3365	19.3358	19.1138	18.4777	17.7203	17.0834	(90)
Living area fraction									fLA = Living area / (4) =			0.4520	(91)
MIT	17.6784	17.9525	18.3591	18.9661	19.4706	19.8932	20.0380	20.0262	19.7646	19.1058	18.3478	17.7158	(92)

Temperature adjustment												0.0000	
adjusted MIT	17.6784	17.9525	18.3591	18.9661	19.4706	19.8932	20.0380	20.0262	19.7646	19.1058	18.3478	17.7158	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9866	0.9769	0.9618	0.9273	0.8602	0.7221	0.5496	0.5911	0.8014	0.9362	0.9776	0.9888	(94)
Useful gains	428.3810	505.1208	546.1058	572.1606	548.3899	451.7158	331.3667	340.1616	441.6343	460.9330	427.7808	407.3373	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1545.7792	1495.7859	1348.0498	1100.4447	843.1766	554.3042	360.0267	377.1876	601.4644	922.9459	1238.9939	1512.0969	(97)
Space heating kWh	831.3443	665.7269	596.6464	380.3645	219.3213	0.0000	0.0000	0.0000	0.0000	343.7376	584.0734	821.9411	(98a)
Space heating requirement - total per year (kWh/year)												4443.1556	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	831.3443	665.7269	596.6464	380.3645	219.3213	0.0000	0.0000	0.0000	0.0000	343.7376	584.0734	821.9411	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4443.1556	
Space heating per m2											(98c) / (4) =	83.1896	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	984.3660	774.9265	790.5384	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6248	0.7133	0.6857	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	615.0644	552.7238	542.0818	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	697.0212	672.3336	641.9733	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	59.0089	88.9897	74.3193	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	14.7522	22.2474	18.5798	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												55.5795	(107)
Energy for space heating												83.1896	(99)
Energy for space cooling												1.0406	(108)
Total												84.2302	(109)
Fabric Energy Efficiency (DFEE)												84.2	(109)

Full SAP Calculation Printout

Property Reference	Apt. 3	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 3	**Prop Type Ref**	
Property			

SAP Rating	43 E	**DER**	16.75	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.84	**DFEE**	84.23	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	173.42	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	53.4100	(1b)	x 3.1000	(2b) =	165.5710	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		165.5710	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8708 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9437	0.9252	0.9067	0.8142	0.7957	0.7032	0.7032	0.6847	0.7402	0.7957	0.8327	0.8697	(22b)
Effective ac	0.9453	0.9280	0.9111	0.8315	0.8166	0.7472	0.7472	0.7344	0.7739	0.8166	0.8467	0.8782	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
Total net area of external elements Aum(A, m2)			119.2300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		40.0468			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.8460	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	63.8928	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.6501	50.7053	49.7792	45.4294	44.6155	40.8270	40.8270	40.1254	42.2863	44.6155	46.2619	47.9831	(38)
Heat transfer coeff	115.5429	114.5981	113.6720	109.3222	108.5083	104.7198	104.7198	104.0182	106.1791	108.5083	110.1547	111.8759	(39)
Average = Sum(39)m / 12 =												109.3183	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.1633	2.1456	2.1283	2.0468	2.0316	1.9607	1.9607	1.9475	1.9880	2.0316	2.0624	2.0947	(40)
HLP (average)												2.0468	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7906	(42)
Hot water usage for mixer showers													
	60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												86.1372	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m													
	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
										Total per year (kWh/year) = Sum(64)m =		1693.6492	(64)
12Total per year (kWh/year)												1694	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	67.2973	59.5806	63.4616	56.1927	54.7421	49.6229	49.1873	50.9719	51.3459	56.9031	60.0780	66.6140	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	83.9693	92.9660	83.9693	86.7683	83.9693	86.7683	83.9693	83.9693	86.7683	83.9693	86.7683	83.9693	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	156.0792	157.6988	153.6174	144.9286	133.9606	123.6523	116.7656	115.1460	119.2274	127.9162	138.8842	149.1925	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	90.4534	88.6616	85.2979	78.0455	73.5780	68.9206	66.1120	68.5107	71.3137	76.4827	83.4416	89.5349	(72)
Total internal gains													
	380.3615	389.1860	372.7442	359.6020	341.3676	329.2008	316.7065	317.4856	327.1690	338.2277	358.9537	372.5564	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	5.3600	36.7938	0.7600	0.8000	0.7700	83.0953	(79)

Solar gains	104.1792	177.4558	242.8027	300.8443	336.9707	334.5339	322.5264	295.5745	262.9040	196.1264	124.7827	89.1557	(83)
Total gains	484.5407	566.6418	615.5469	660.4463	678.3383	663.7347	639.2329	613.0601	590.0730	534.3542	483.7364	461.7121	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	32.1009	32.3655	32.6292	33.9275	34.1820	35.4186	35.4186	35.6575	34.9318	34.1820	33.6711	33.1530	
alpha	3.1401	3.1577	3.1753	3.2618	3.2788	3.3612	3.3612	3.3772	3.3288	3.2788	3.2447	3.2102	
util living area													
	0.9902	0.9832	0.9721	0.9452	0.8909	0.7744	0.6327	0.6684	0.8443	0.9527	0.9836	0.9917	(86)
MIT	18.5436	18.8119	19.2115	19.7948	20.3000	20.7269	20.9015	20.8796	20.5918	19.9288	19.1837	18.5655	(87)
Th 2	19.2267	19.2380	19.2492	19.3023	19.3123	19.3597	19.3597	19.3685	19.3413	19.3123	19.2920	19.2710	(88)
util rest of house													
	0.9866	0.9770	0.9610	0.9210	0.8354	0.6508	0.4344	0.4777	0.7460	0.9266	0.9764	0.9886	(89)
MIT 2	16.5163	16.8628	17.3743	18.1313	18.7369	19.2105	19.3342	19.3328	19.0814	18.3133	17.3692	16.5690	(90)

Living area fraction											fLA = Living area / (4) =	0.4520	(91)
MIT	17.4326	17.7438	18.2047	18.8832	19.4434	19.8959	20.0426	20.0319	19.7641	19.0435	18.1893	17.4714	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4326	17.7438	18.2047	18.8832	19.4434	19.8959	20.0426	20.0319	19.7641	19.0435	18.1893	17.4714	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9809	0.9692	0.9516	0.9131	0.8408	0.6973	0.5249	0.5638	0.7762	0.9210	0.9695	0.9837	(94)
Useful gains	475.3063	549.2068	585.7390	603.0265	570.3185	462.8023	335.5274	345.6602	458.0427	492.1341	468.9832	454.1730	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1517.3765	1471.8701	1330.4935	1091.3831	840.2230	554.5828	360.5093	377.7833	601.4048	916.1865	1221.5400	1484.7501	(97)
Space heating kWh	775.3002	620.0298	554.0974	351.6168	200.8090	0.0000	0.0000	0.0000	0.0000	315.4950	541.8409	766.7494	(98a)
Space heating requirement - total per year (kWh/year)												4125.9385	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	775.3002	620.0298	554.0974	351.6168	200.8090	0.0000	0.0000	0.0000	0.0000	315.4950	541.8409	766.7494	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4125.9385	
Space heating per m2											(98c) / (4) =	77.2503	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	775.3002	620.0298	554.0974	351.6168	200.8090	0.0000	0.0000	0.0000	0.0000	315.4950	541.8409	766.7494	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	775.3002	620.0298	554.0974	351.6168	200.8090	0.0000	0.0000	0.0000	0.0000	315.4950	541.8409	766.7494	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.2347	13.0241	11.7267	8.5915	6.6363	5.4219	6.0539	7.8691	10.2211	13.4107	15.1473	16.6859	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4125.9385	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1693.6492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	131.0232	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5950.6109	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4125.9385	0.1544	636.8490	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1693.6492	0.1412	239.0608	(264)

Space and water heating			875.9098	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.0232	0.1443	18.9107	(268)
Total CO2, kg/year			894.8205	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			16.7500	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4125.9385	1.5714	6483.6984	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1693.6492	1.5219	2577.6300	(278)
Space and water heating			9061.3284	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	131.0232	1.5338	200.9678	(282)
Total Primary energy kWh/year			9262.2962	(286)
Dwelling Primary energy Rate (DPER)			173.4200	(287)

Full SAP Calculation Printout

elmhurst energy

Property Reference	Apt. 3	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 3	**Prop Type Ref**	
Property			

SAP Rating	43 E	**DER**	16.75	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.84	**DFEE**	84.23	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	173.42	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		53.4100	(1b)	x 3.1000	(2b) =	165.5710	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	165.5710	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8708	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9437	0.9252	0.9067	0.8142	0.7957	0.7032	0.7032	0.6847	0.7402	0.7957	0.8327	0.8697	(22b)
Effective ac	0.9453	0.9280	0.9111	0.8315	0.8166	0.7472	0.7472	0.7344	0.7739	0.8166	0.8467	0.8782	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
Total net area of external elements Aum(A, m2)			119.2300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		40.0468			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.8460	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	63.8928	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.6501	50.7053	49.7792	45.4294	44.6155	40.8270	40.8270	40.1254	42.2863	44.6155	46.2619	47.9831	(38)
Heat transfer coeff	115.5429	114.5981	113.6720	109.3222	108.5083	104.7198	104.7198	104.0182	106.1791	108.5083	110.1547	111.8759	(39)
Average = Sum(39)m / 12 =												109.3183	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.1633	2.1456	2.1283	2.0468	2.0316	1.9607	1.9607	1.9475	1.9880	2.0316	2.0624	2.0947	(40)
HLP (average)												2.0468	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7906	(42)
Hot water usage for mixer showers													
	60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												86.1372	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m													
	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
										Total per year (kWh/year) = Sum(64)m =		1693.6492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	67.2973	59.5806	63.4616	56.1927	54.7421	49.6229	49.1873	50.9719	51.3459	56.9031	60.0780	66.6140	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.5477	16.4739	13.3975	10.1427	7.5818	6.4009	6.9164	8.9902	12.0666	15.3213	17.8823	19.0632	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	232.9540	235.3713	229.2797	216.3114	199.9412	184.5556	174.2771	171.8597	177.9513	190.9196	207.2898	222.6754	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	90.4534	88.6616	85.2979	78.0455	73.5780	68.9206	66.1120	68.5107	71.3137	76.4827	83.4416	89.5349	(72)
Total internal gains													
	425.3023	423.8541	411.3223	387.8469	364.4484	343.2244	330.6527	332.7079	344.6790	366.0709	391.9609	414.6208	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	5.3600	36.7938	0.7600	0.8000	0.7700	83.0953	(79)

Solar gains	104.1792	177.4558	242.8027	300.8443	336.9707	334.5339	322.5264	295.5745	262.9040	196.1264	124.7827	89.1557	(83)
Total gains	529.4816	601.3099	654.1250	688.6912	701.4191	677.7584	653.1791	628.2824	607.5829	562.1973	516.7436	503.7765	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	32.1009	32.3655	32.6292	33.9275	34.1820	35.4186	35.4186	35.6575	34.9318	34.1820	33.6711	33.1530	
alpha	3.1401	3.1577	3.1753	3.2618	3.2788	3.3612	3.3612	3.3772	3.3288	3.2788	3.2447	3.2102	
util living area													
	0.9874	0.9803	0.9672	0.9392	0.8827	0.7664	0.6232	0.6577	0.8351	0.9462	0.9803	0.9893	(86)
MIT	18.6165	18.8668	19.2700	19.8338	20.3256	20.7363	20.9060	20.8856	20.6078	19.9684	19.2366	18.6349	(87)
Th 2	19.2267	19.2380	19.2492	19.3023	19.3123	19.3597	19.3597	19.3685	19.3413	19.3123	19.2920	19.2710	(88)
util rest of house													
	0.9829	0.9731	0.9545	0.9129	0.8246	0.6416	0.4261	0.4677	0.7342	0.9173	0.9718	0.9854	(89)
MIT 2	16.6084	16.9315	17.4460	18.1766	18.7629	19.2170	19.3357	19.3350	19.0945	18.3589	17.4351	16.6569	(90)
Living area fraction									fLA = Living area / (4) =			0.4520	(91)

MIT	17.5160	17.8062	18.2704	18.9256	19.4692	19.9037	20.0454	20.0358	19.7785	19.0863	18.2493	17.5509	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5160	17.8062	18.2704	18.9256	19.4692	19.9037	20.0454	20.0358	19.7785	19.0863	18.2493	17.5509	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9762	0.9646	0.9445	0.9053	0.8313	0.6889	0.5160	0.5535	0.7660	0.9121	0.9642	0.9796	(94)
Useful gains	516.8930	579.9980	617.8341	623.4620	583.0622	466.9224	337.0524	347.7804	465.4262	512.7903	498.2361	493.4770	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1527.0183	1479.0264	1337.9683	1096.0209	843.0262	555.3996	360.8048	378.1901	602.9381	920.8378	1228.1521	1493.6437	(97)
Space heating kWh													
	751.5332	604.1471	535.7798	340.2424	193.4132	0.0000	0.0000	0.0000	0.0000	303.5873	525.5395	744.1240	(98a)
Space heating requirement - total per year (kWh/year)												3998.3666	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	751.5332	604.1471	535.7798	340.2424	193.4132	0.0000	0.0000	0.0000	0.0000	303.5873	525.5395	744.1240	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3998.3666	
Space heating per m2											(98c) / (4) =	74.8618	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	751.5332	604.1471	535.7798	340.2424	193.4132	0.0000	0.0000	0.0000	0.0000	303.5873	525.5395	744.1240	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	751.5332	604.1471	535.7798	340.2424	193.4132	0.0000	0.0000	0.0000	0.0000	303.5873	525.5395	744.1240	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.2347	13.0241	11.7267	8.5915	6.6363	5.4219	6.0539	7.8691	10.2211	13.4107	15.1473	16.6859	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3998.3666	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1693.6492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	131.0232	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5823.0390	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3998.3666	16.4900	659.3306	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1693.6492	16.4900	279.2828	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	131.0232	16.4900	21.6057	(250)
Additional standing charges			0.0000	(251)
Total energy cost			960.2191	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):			0.3600 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =		3.5126 (257)
SAP value			43.0511
SAP rating (Section 12)			43 (258)
SAP band			E

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3998.3666	0.1544	617.2595	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1693.6492	0.1412	239.0608	(264)
Space and water heating			856.3203	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.0232	0.1443	18.9107	(268)
Total CO2, kg/year			875.2310	(272)
CO2 emissions per m2			16.3900	(273)
EI value			88.0824	
EI rating			88	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Ground floor	53.4100 (1b)	x 3.1000 (2b) =	165.5710	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	165.5710	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8708	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8882	0.8697	0.8512	0.7772	0.7587	0.6847	0.6847	0.6847	0.6847	0.7772	0.7957	0.8327	(22b)
Effective ac	0.8945	0.8782	0.8623	0.8020	0.7878	0.7344	0.7344	0.7344	0.7344	0.8020	0.8166	0.8467	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
Total net area of external elements Aum(A, m2)			119.2300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		40.0468			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K												250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)												23.8460	(36)
Point Thermal bridges											(36a) =	0.0000	
Total fabric heat loss											(33) + (36) + (36a) =	63.8928	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	48.8718	47.9831	47.1132	43.8204	43.0440	40.1254	40.1254	40.1254	40.1254	43.8204	44.6155	46.2619	(38)
Heat transfer coeff	112.7646	111.8759	111.0060	107.7132	106.9368	104.0182	104.0182	104.0182	104.0182	107.7132	108.5083	110.1547	(39)
Average = Sum(39)m / 12 =												107.7288	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.1113	2.0947	2.0784	2.0167	2.0022	1.9475	1.9475	1.9475	1.9475	2.0167	2.0316	2.0624	(40)
HLP (average)												2.0170	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7906	(42)
Hot water usage for mixer showers	60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												86.1372	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
										Total per year (kWh/year) = Sum(64)m =		1693.6492	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	67.2973	59.5806	63.4616	56.1927	54.7421	49.6229	49.1873	50.9719	51.3459	56.9031	60.0780	66.6140	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	18.5477	16.4739	13.3975	10.1427	7.5818	6.4009	6.9164	8.9902	12.0666	15.3213	17.8823	19.0632	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	232.9540	235.3713	229.2797	216.3114	199.9412	184.5556	174.2771	171.8597	177.9513	190.9196	207.2898	222.6754	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)	90.4534	88.6616	85.2979	78.0455	73.5780	68.9206	66.1120	68.5107	71.3137	76.4827	83.4416	89.5349	(72)
Total internal gains	425.3023	423.8541	411.3223	387.8469	364.4484	343.2244	330.6527	332.7079	344.6790	366.0709	391.9609	414.6208	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)
Southwest	5.3600	33.9635	0.7600	0.8000	0.7700	76.7034	(79)

Solar gains	96.1654	167.5971	240.2735	304.8556	335.2157	339.5519	317.4069	286.1613	262.9040	193.1548	117.2201	84.9102	(83)
Total gains	521.4678	591.4512	651.5958	692.7025	699.6641	682.7764	648.0596	618.8692	607.5829	559.2257	509.1811	499.5310	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)		

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	32.8918	33.1530	33.4129	34.4343	34.6843	35.6575	35.6575	35.6575	35.6575	34.4343	34.1820	33.6711	
alpha	3.1928	3.2102	3.2275	3.2956	3.3123	3.3772	3.3772	3.3772	3.3772	3.2956	3.2788	3.2447	
util living area													
	0.9871	0.9800	0.9659	0.9349	0.8729	0.7555	0.6440	0.6737	0.8311	0.9452	0.9794	0.9888	(86)
MIT	18.7398	18.9656	19.3553	19.9007	20.3890	20.7555	20.8928	20.8739	20.6272	19.9932	19.3291	18.7410	(87)
Th 2	19.2602	19.2710	19.2816	19.3222	19.3319	19.3685	19.3685	19.3685	19.3685	19.3222	19.3123	19.2920	(88)
util rest of house													
	0.9823	0.9726	0.9526	0.9067	0.8098	0.6274	0.4552	0.4875	0.7302	0.9157	0.9702	0.9846	(89)
MIT 2	16.7844	17.0759	17.5722	18.2702	18.8470	19.2398	19.3376	19.3292	19.1339	18.3955	17.5643	16.8042	(90)
Living area fraction										fLA = Living area / (4) =		0.4520	(91)
MIT	17.6682	17.9300	18.3782	19.0071	19.5440	19.9249	20.0405	20.0274	19.8088	19.1176	18.3620	17.6796	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.6682	17.9300	18.3782	19.0071	19.5440	19.9249	20.0405	20.0274	19.8088	19.1176	18.3620	17.6796	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9758	0.9643	0.9429	0.8999	0.8195	0.6770	0.5406	0.5711	0.7626	0.9109	0.9627	0.9788	(94)
Useful gains	508.8291	570.3373	614.3715	623.3605	573.3833	462.2537	350.3386	353.4379	463.3576	509.3830	490.2040	488.9177	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1462.3512	1424.1819	1296.3453	1067.1298	806.7267	543.4809	378.6808	387.7157	593.8209	906.6850	1178.6128	1440.7745	(97)
Space heating kWh													
	709.4204	573.7836	507.3885	319.5139	173.6075	0.0000	0.0000	0.0000	0.0000	295.5927	495.6543	708.1814	(98a)
Space heating requirement - total per year (kWh/year)												3783.1424	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	709.4204	573.7836	507.3885	319.5139	173.6075	0.0000	0.0000	0.0000	0.0000	295.5927	495.6543	708.1814	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3783.1424	
Space heating per m2											(98c) / (4) =	70.8321	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	709.4204	573.7836	507.3885	319.5139	173.6075	0.0000	0.0000	0.0000	0.0000	295.5927	495.6543	708.1814	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	709.4204	573.7836	507.3885	319.5139	173.6075	0.0000	0.0000	0.0000	0.0000	295.5927	495.6543	708.1814	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.2347	13.0241	11.7267	8.5915	6.6363	5.4219	6.0539	7.8691	10.2211	13.4107	15.1473	16.6859	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3783.1424	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1693.6492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	131.0232	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5607.8148	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3783.1424	26.0600	985.8869	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1693.6492	26.0600	441.3650	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	131.0232	26.0600	34.1447	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1461.3965	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3783.1424	0.1544	584.1560	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1693.6492	0.1412	239.0608	(264)
Space and water heating			823.2168	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.0232	0.1443	18.9107	(268)
Total CO2, kg/year			842.1275	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3783.1424	1.5717	5945.8485	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1693.6492	1.5219	2577.6300	(278)
Space and water heating			8523.4785	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	131.0232	1.5338	200.9678	(282)
Total Primary energy kWh/year			8724.4463	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 3

Current energy efficiency rating: E 43
Current environmental impact rating: B 88

N Solar water heating — Not applicable
U Solar photovoltaic panels — Not applicable
V2 Wind turbine — Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 43
Potential environmental impact rating: B 88

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£1461	£1461	£0
Space heating	£986	£986	£0
Water heating	£441	£441	£0
Lighting	£34	£34	£0
Total cost of fuels	£1461	£1461	£0
Total cost of uses	£1461	£1461	£0
Delivered energy	105 kWh/m²	105 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m²	16 kg/m²	16 kg/m²	0 kg/m²
Primary energy	163 kWh/m²	163 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	53.4100	(1b)	x 3.1000	(2b) =	165.5710	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		165.5710	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8708	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9437	0.9252	0.9067	0.8142	0.7957	0.7032	0.7032	0.6847	0.7402	0.7957	0.8327	0.8697	(22b)
Effective ac	0.9453	0.9280	0.9111	0.8315	0.8166	0.7472	0.7472	0.7344	0.7739	0.8166	0.8467	0.8782	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
Total net area of external elements Aum(A, m2)			119.2300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		40.0468			(33)
Party Ceiling 1			53.4100					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							23.8460	(36)
Point Thermal bridges					(36a) =		0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		63.8928	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.6501	50.7053	49.7792	45.4294	44.6155	40.8270	40.8270	40.1254	42.2863	44.6155	46.2619	47.9831	(38)
Heat transfer coeff	115.5429	114.5981	113.6720	109.3222	108.5083	104.7198	104.7198	104.0182	106.1791	108.5083	110.1547	111.8759	(39)
Average = Sum(39)m / 12 =												109.3183	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.1633	2.1456	2.1283	2.0468	2.0316	1.9607	1.9607	1.9475	1.9880	2.0316	2.0624	2.0947	(40)
HLP (average)												2.0468	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7906	(42)
Hot water usage for mixer showers	60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												86.1372	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)

Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
										Total per year (kWh/year) = Sum(64)m =		1693.6492	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	67.2973	59.5806	63.4616	56.1927	54.7421	49.6229	49.1873	50.9719	51.3459	56.9031	60.0780	66.6140	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.5477	16.4739	13.3975	10.1427	7.5818	6.4009	6.9164	8.9902	12.0666	15.3213	17.8823	19.0632	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	232.9540	235.3713	229.2797	216.3114	199.9412	184.5556	174.2771	171.8597	177.9513	190.9196	207.2898	222.6754	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	90.4534	88.6616	85.2979	78.0455	73.5780	68.9206	66.1120	68.5107	71.3137	76.4827	83.4416	89.5349	(72)
Total internal gains													
	425.3023	423.8541	411.3223	387.8469	364.4484	343.2244	330.6527	332.7079	344.6790	366.0709	391.9609	414.6208	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	5.3600	36.7938	0.7600	0.8000	0.7700	83.0953	(79)

Solar gains	104.1792	177.4558	242.8027	300.8443	336.9707	334.5339	322.5264	295.5745	262.9040	196.1264	124.7827	89.1557	(83)
Total gains	529.4816	601.3099	654.1250	688.6912	701.4191	677.7584	653.1791	628.2824	607.5829	562.1973	516.7436	503.7765	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	32.1009	32.3655	32.6292	33.9275	34.1820	35.4186	35.4186	35.6575	34.9318	34.1820	33.6711	33.1530	
alpha	3.1401	3.1577	3.1753	3.2618	3.2788	3.3612	3.3612	3.3772	3.3288	3.2788	3.2447	3.2102	
util living area													
	0.9874	0.9803	0.9672	0.9392	0.8827	0.7664	0.6232	0.6577	0.8351	0.9462	0.9803	0.9893	(86)
MIT	18.6165	18.8668	19.2700	19.8338	20.3256	20.7363	20.9060	20.8856	20.6078	19.9684	19.2366	18.6349	(87)
Th 2	19.2267	19.2380	19.2492	19.3023	19.3123	19.3597	19.3597	19.3685	19.3413	19.3123	19.2920	19.2710	(88)
util rest of house													
	0.9829	0.9731	0.9545	0.9129	0.8246	0.6416	0.4261	0.4677	0.7342	0.9173	0.9718	0.9854	(89)
MIT 2	16.6084	16.9315	17.4460	18.1766	18.7629	19.2170	19.3357	19.3350	19.0945	18.3589	17.4351	16.6569	(90)
Living area fraction									fLA = Living area / (4) =			0.4520	(91)
MIT	17.5160	17.8062	18.2704	18.9256	19.4692	19.9037	20.0454	20.0358	19.7785	19.0863	18.2493	17.5509	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5160	17.8062	18.2704	18.9256	19.4692	19.9037	20.0454	20.0358	19.7785	19.0863	18.2493	17.5509	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9762	0.9646	0.9445	0.9053	0.8313	0.6889	0.5160	0.5535	0.7660	0.9121	0.9642	0.9796	(94)
Useful gains	516.8930	579.9980	617.8341	623.4620	583.0622	466.9224	337.0524	347.7804	465.4262	512.7903	498.2361	493.4770	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1527.0183	1479.0264	1337.9683	1096.0209	843.0262	555.3996	360.8048	378.1901	602.9381	920.8378	1228.1521	1493.6437	(97)
Space heating kWh													
	751.5332	604.1471	535.7798	340.2424	193.4132	0.0000	0.0000	0.0000	0.0000	303.5873	525.5395	744.1240	(98a)
Space heating requirement - total per year (kWh/year)												3998.3666	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	751.5332	604.1471	535.7798	340.2424	193.4132	0.0000	0.0000	0.0000	0.0000	303.5873	525.5395	744.1240	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3998.3666	
Space heating per m2											(98c) / (4) =	74.8618	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	751.5332	604.1471	535.7798	340.2424	193.4132	0.0000	0.0000	0.0000	0.0000	303.5873	525.5395	744.1240	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	751.5332	604.1471	535.7798	340.2424	193.4132	0.0000	0.0000	0.0000	0.0000	303.5873	525.5395	744.1240	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.2347	13.0241	11.7267	8.5915	6.6363	5.4219	6.0539	7.8691	10.2211	13.4107	15.1473	16.6859	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3998.3666	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1693.6492	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	131.0232	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5823.0390	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3998.3666	16.4900	659.3306	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1693.6492	16.4900	279.2828	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	131.0232	16.4900	21.6057	(250)
Additional standing charges			0.0000	(251)
Total energy cost			960.2191	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.5126	(257)
SAP value		43.0511	
SAP rating (Section 12)		43	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3998.3666	0.1544	617.2595	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1693.6492	0.1412	239.0608	(264)
Space and water heating			856.3203	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.0232	0.1443	18.9107	(268)
Total CO2, kg/year			875.2310	(272)
CO2 emissions per m2			16.3900	(273)
EI value			88.0824	
EI rating			88	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	53.4100	(1b)	x 3.1000	(2b) =	165.5710	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		165.5710	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8708 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8882	0.8697	0.8512	0.7772	0.7587	0.6847	0.6847	0.6847	0.6847	0.7772	0.7957	0.8327	(22b)
Effective ac	0.8945	0.8782	0.8623	0.8020	0.7878	0.7344	0.7344	0.7344	0.7344	0.8020	0.8166	0.8467	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
Total net area of external elements Aum(A, m2)			119.2300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	40.0468			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.8460	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 63.8928	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	48.8718	47.9831	47.1132	43.8204	43.0440	40.1254	40.1254	40.1254	40.1254	43.8204	44.6155	46.2619	(38)
Heat transfer coeff	112.7646	111.8759	111.0060	107.7132	106.9368	104.0182	104.0182	104.0182	104.0182	107.7132	108.5083	110.1547	(39)
Average = Sum(39)m / 12 =												107.7288	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.1113	2.0947	2.0784	2.0167	2.0022	1.9475	1.9475	1.9475	1.9475	2.0167	2.0316	2.0624	(40)
HLP (average)												2.0170	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.7906	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												86.1372	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	

```
Distribution loss  (46)m = 0.15 x (45)m
                22.3044    19.6027    20.5740    17.5546    16.6403    14.5908    14.1344    14.9395    15.3681    17.6152    19.3073    21.9961 (46)
Water storage loss:
Store volume                                                                                                                          150.0000 (47)
a) If  manufacturer declared loss factor is known  (kWh/day):                                                                           1.2000 (48)
  Temperature factor from Table 2b                                                                                                      0.6000 (49)
Enter (49) or (54) in (55)                                                                                                              0.7200 (55)
Total storage loss
                22.3200    20.1600    22.3200    21.6000    22.3200    21.6000    22.3200    22.3200    21.6000    22.3200    21.6000    22.3200 (56)
If cylinder contains dedicated solar storage
                22.3200    20.1600    22.3200    21.6000    22.3200    21.6000    22.3200    22.3200    21.6000    22.3200    21.6000    22.3200 (57)
Primary loss     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (59)
Combi loss       0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (61)
Total heat required for water heating calculated for each month
               171.0157   150.8445   159.4798   138.6308   133.2555   118.8718   116.5495   121.9168   124.0538   139.7549   150.3157   168.9605 (62)
WWHRS            0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (63a)
PV diverter      0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (63b)
Solar input      0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (63c)
FGHRS            0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (63d)
Output from w/h
               171.0157   150.8445   159.4798   138.6308   133.2555   118.8718   116.5495   121.9168   124.0538   139.7549   150.3157   168.9605 (64)
                                                                                   Total per year (kWh/year) = Sum(64)m =      1693.6492 (64)
Electric shower(s)
                 0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (64a)
                                                      Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =      0.0000 (64a)
Heat gains from water heating, kWh/month
                67.2973    59.5806    63.4616    56.1927    54.7421    49.6229    49.1873    50.9719    51.3459    56.9031    60.0780    66.6140 (65)


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5. Internal gains (see Table 5 and 5a)
----------------------------------------------------------------------------------------------------
Metabolic gains (Table 5), Watts
                  Jan        Feb        Mar        Apr        May        Jun        Jul        Aug        Sep        Oct        Nov        Dec
(66)m          107.4384   107.4384   107.4384   107.4384   107.4384   107.4384   107.4384   107.4384   107.4384   107.4384   107.4384   107.4384 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5
                18.5477    16.4739    13.3975    10.1427     7.5818     6.4009     6.9164     8.9902    12.0666    15.3213    17.8823    19.0632 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5
               232.9540   235.3713   229.2797   216.3114   199.9412   184.5556   174.2771   171.8597   177.9513   190.9196   207.2898   222.6754 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5
                47.5345    47.5345    47.5345    47.5345    47.5345    47.5345    47.5345    47.5345    47.5345    47.5345    47.5345    47.5345 (69)
Pumps, fans      0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)
               -71.6256   -71.6256   -71.6256   -71.6256   -71.6256   -71.6256   -71.6256   -71.6256   -71.6256   -71.6256   -71.6256   -71.6256 (71)
Water heating gains (Table 5)
                90.4534    88.6616    85.2979    78.0455    73.5780    68.9206    66.1120    68.5107    71.3137    76.4827    83.4416    89.5349 (72)
Total internal gains
               425.3023   423.8541   411.3223   387.8469   364.4484   343.2244   330.6527   332.7079   344.6790   366.0709   391.9609   414.6208 (73)


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6. Solar gains
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[Jan]                                        Area          Solar flux             g               FF              Access               Gains
                                               m2           Table 6a   Specific data   Specific data             factor                   W
                                                                W/m2     or Table 6b     or Table 6c           Table 6d
----------------------------------------------------------------------------------------------------
Southeast                                  1.3600           33.9635          0.7600          0.8000             0.7700             19.4621 (77)
Southwest                                  5.3600           33.9635          0.7600          0.8000             0.7700             76.7034 (79)
----------------------------------------------------------------------------------------------------

Solar gains     96.1654   167.5971   240.2735   304.8556   335.2157   339.5519   317.4069   286.1613   262.9040   193.1548   117.2201    84.9102 (83)
Total gains    521.4678   591.4512   651.5958   692.7025   699.6641   682.7764   648.0596   618.8692   607.5829   559.2257   509.1811   499.5310 (84)


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7. Mean internal temperature (heating season)
----------------------------------------------------------------------------------------------------
Temperature during heating periods in the living area from Table 9, Th1 (C)                                                            21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)
                  Jan        Feb        Mar        Apr        May        Jun        Jul        Aug        Sep        Oct        Nov        Dec
tau             32.8918    33.1530    33.4129    34.4343    34.6843    35.6575    35.6575    35.6575    35.6575    34.4343    34.1820    33.6711
alpha            3.1928     3.2102     3.2275     3.2956     3.3123     3.3772     3.3772     3.3772     3.3772     3.2956     3.2788     3.2447
util living area
                 0.9871     0.9800     0.9659     0.9349     0.8729     0.7555     0.6440     0.6737     0.8311     0.9452     0.9794     0.9888 (86)

MIT             18.7398    18.9656    19.3553    19.9007    20.3890    20.7555    20.8928    20.8739    20.6272    19.9932    19.3291    18.7410 (87)
Th 2            19.2602    19.2710    19.2816    19.3222    19.3319    19.3685    19.3685    19.3685    19.3685    19.3222    19.3123    19.2920 (88)
util rest of house
                 0.9823     0.9726     0.9526     0.9067     0.8098     0.6274     0.4552     0.4875     0.7302     0.9157     0.9702     0.9846 (89)
MIT 2           16.7844    17.0759    17.5722    18.2702    18.8470    19.2398    19.3376    19.3292    19.1339    18.3955    17.5643    16.8042 (90)
Living area fraction                                                                                     fLA = Living area / (4) =      0.4520 (91)
MIT             17.6682    17.9300    18.3782    19.0071    19.5440    19.9249    20.0405    20.0274    19.8088    19.1176    18.3620    17.6796 (92)
Temperature adjustment                                                                                                                   0.0000
adjusted MIT    17.6682    17.9300    18.3782    19.0071    19.5440    19.9249    20.0405    20.0274    19.8088    19.1176    18.3620    17.6796 (93)


----------------------------------------------------------------------------------------------------
8. Space heating requirement
----------------------------------------------------------------------------------------------------

                  Jan        Feb        Mar        Apr        May        Jun        Jul        Aug        Sep        Oct        Nov        Dec
Utilisation      0.9758     0.9643     0.9429     0.8999     0.8195     0.6770     0.5406     0.5711     0.7626     0.9109     0.9627     0.9788 (94)
Useful gains   508.8291   570.3373   614.3715   623.3605   573.3833   462.2537   350.3386   353.4379   463.3576   509.3830   490.2040   488.9177 (95)
Ext temp.        4.7000     5.2000     6.7000     9.1000    12.0000    14.7000    16.4000    16.3000    14.1000    10.7000     7.5000     4.6000 (96)
Heat loss rate W
              1462.3512  1424.1819  1296.3453  1067.1298   806.7267   543.4809   378.6808   387.7157   593.8209   906.6850  1178.6128  1440.7745 (97)
Space heating kWh
               709.4204   573.7836   507.3885   319.5139   173.6075     0.0000     0.0000     0.0000     0.0000   295.5927   495.6543   708.1814 (98a)
Space heating requirement - total per year (kWh/year)                                                                                3783.1424
Solar heating kWh
                 0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000     0.0000 (98b)
Solar heating contribution - total per year (kWh/year)                                                                                  0.0000
Space heating kWh
               709.4204   573.7836   507.3885   319.5139   173.6075     0.0000     0.0000     0.0000     0.0000   295.5927   495.6543   708.1814 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)                                                       3783.1424
Space heating per m2                                                                                          (98c) / (4) =          70.8321 (99)
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9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	709.4204	573.7836	507.3885	319.5139	173.6075	0.0000	0.0000	0.0000	0.0000	295.5927	495.6543	708.1814	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	709.4204	573.7836	507.3885	319.5139	173.6075	0.0000	0.0000	0.0000	0.0000	295.5927	495.6543	708.1814	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	171.0157	150.8445	159.4798	138.6308	133.2555	118.8718	116.5495	121.9168	124.0538	139.7549	150.3157	168.9605	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.2347	13.0241	11.7267	8.5915	6.6363	5.4219	6.0539	7.8691	10.2211	13.4107	15.1473	16.6859	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3783.1424	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1693.6492	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												131.0232	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5607.8148	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3783.1424	26.0600	985.8869	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1693.6492	26.0600	441.3650	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	131.0232	26.0600	34.1447	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1461.3965	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3783.1424	0.1544	584.1560	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1693.6492	0.1412	239.0608	(264)
Space and water heating			823.2168	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.0232	0.1443	18.9107	(268)
Total CO2, kg/year			842.1275	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3783.1424	1.5717	5945.8485	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1693.6492	1.5219	2577.6300	(278)
Space and water heating			8523.4785	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	131.0232	1.5338	200.9678	(282)
Total Primary energy kWh/year			8724.4463	(286)

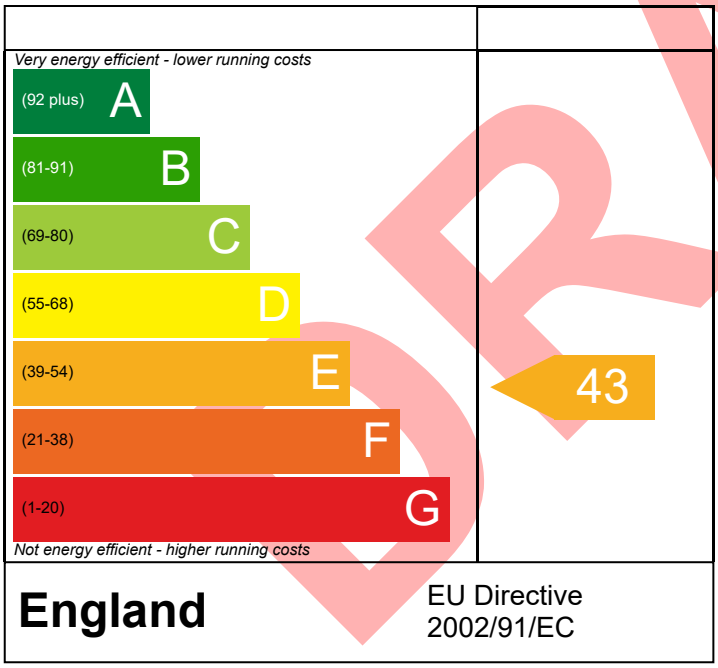
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	53.41 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

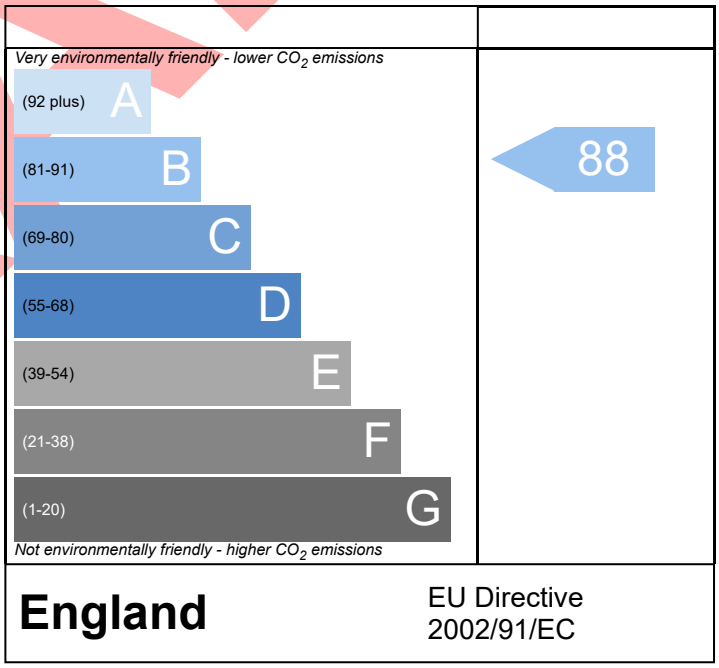
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

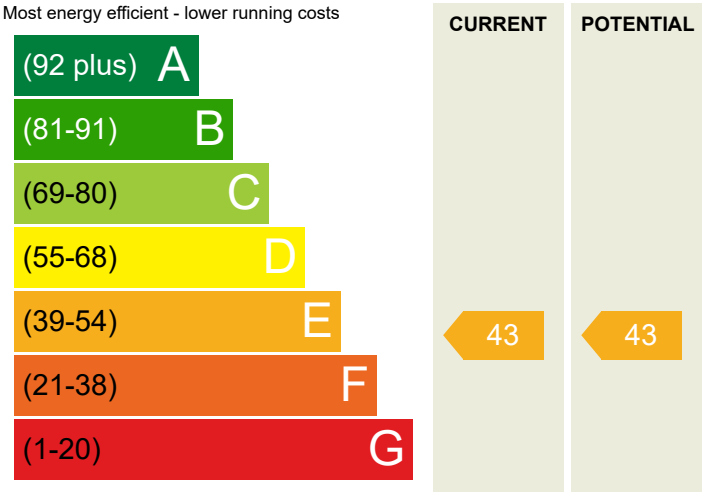
Energy Report

Dwelling Address	
Reference	Apt. 3-Apt. 3
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	53

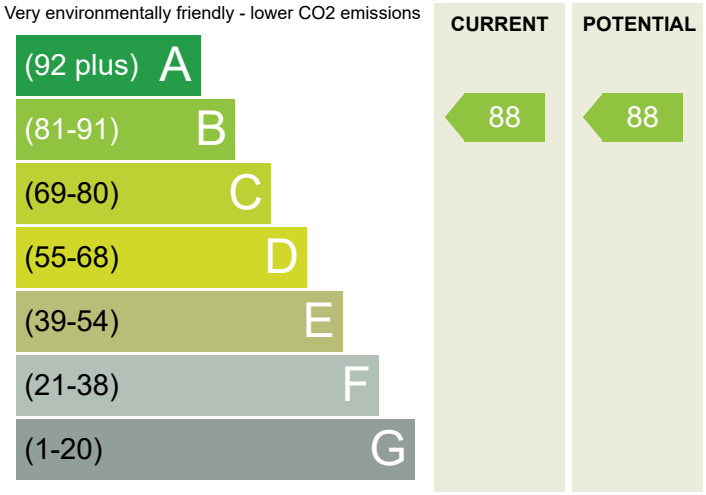
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

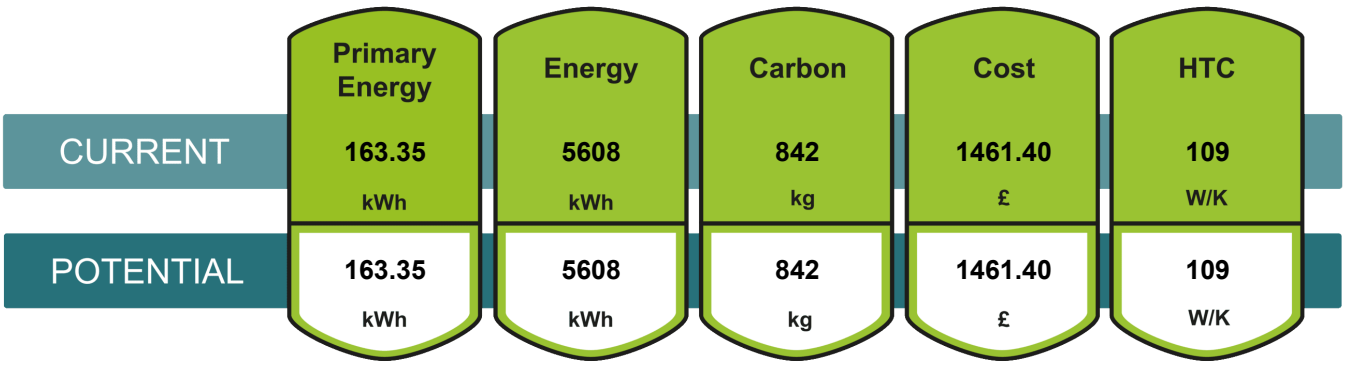
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£34	£34	You could save £0
Heating	£986	£986	
Hot Water	£441	£441	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1461	£1461	

Estimated energy use and potential savings

Space Heating
3783
kWh per year

Water Heating
1694
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 3	Issued on Date	01/10/2024
Assessment Reference	Apt. 3	Prop Type Ref	Detached Flat
Property			

SAP Rating	43 E	DER	16.75	TER	
Environmental	88 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.84	DFEE	84.23	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	173.42	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	44.93	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	20.89	m²	

Comments

Heat Loss Floors

Description	Heatloss Floor 1		
Type	Ground Floor - Timber		
Construction	Other		
U-value	0.25	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	53.41	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SW1	New Glazing	External Wall 1	South West	5.36
W SE1	New Glazing	External Wall 1	South East	1.36
D NW	New Door	Corridor Wall	North West	2.10

Comments

Thermal Bridging

Default

Y-value: 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing

No

Property Tested? Yes

Test Method: Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	100.00	10.00	1000.00	10

Comments

Main Heating 1

Fuel Type	SAP table	
Winter Efficiency	Electricity	
Summer Efficiency		%
Model Name		%
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue		
Heat Emitter	No	

Flow Temperature	
Flow Temperature Value	

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	Hot Water Cylinder	
Independent Time Control	No	
Cylinder Stat	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day
Pipes insulation		

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 4	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 4	**Prop Type Ref**	
Property			

SAP Rating	48 E	**DER**	15.21	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.78	**DFEE**	73.97	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	157.72	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	24.68 m	54.51 m²	2.67 m

8.0 Living Area	22.10	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	18.15	12.75	0.00	None	5.40	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	47.74	45.64	0.00	None	2.10	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	4.58	4.58	None	0.00	Enter Gross Area	0.00

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	49.93

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Other	0.25	None	0.00	0.00	54.51

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40

Summary for Input Data

New Door	Manufacturer	Solid Door					0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled		0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SE1	New Glazing	External Wall 1	South East	5.40	0
D NW	New Door	Corridor Wall	North West	2.10	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	100.00	10.00	1000.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

Summary for Input Data

elmhurst energy

27.0 Secondary Heating	None
28.0 Water Heating	
Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 4	Issued on Date	01/10/2024
Assessment Reference	Apt. 4	Prop Type Ref	
Property			

SAP Rating	48 E	DER	15.21	TER	
Environmental	89 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.78	DFEE	73.97	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	157.72	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b)	x 2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

---

2. Ventilation rate

---

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8769	0.8597	0.8425	0.7565	0.7393	0.6534	0.6534	0.6362	0.6877	0.7393	0.7737	0.8081	(22b)
Effective ac	0.8845	0.8695	0.8549	0.7862	0.7733	0.7134	0.7134	0.7024	0.7365	0.7733	0.7993	0.8265	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
Corridor Wall	47.7400	2.1000	45.6400	0.1800	8.2152			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			124.9800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4996			(33)
Party Ceiling 1			49.9300					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		24.9960	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	61.4956	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	42.4795	41.7624	41.0596	37.7585	37.1408	34.2657	34.2657	33.7332	35.3731	37.1408	38.3903	39.6966	(38)
Heat transfer coeff	103.9751	103.2580	102.5552	99.2541	98.6364	95.7613	95.7613	95.2288	96.8687	98.6364	99.8859	101.1922	(39)

Average = Sum(39)m / 12 = 99.2511

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9074	1.8943	1.8814	1.8208	1.8095	1.7568	1.7568	1.7470	1.7771	1.8095	1.8324	1.8564	(40)
HLP (average)												1.8208	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8230 (42)

Hot water usage for mixer showers

61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)

Average daily hot water use (litres/day) 87.0022 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)										Total = Sum(45)m =		1445.2196	
Distribution loss (46)m = 0.15 x (45)m													
	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
										Total per year (kWh/year) = Sum(64)m =		1708.0196	(64)
12Total per year (kWh/year)												1708	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	67.7939	60.0170	63.9197	56.5835	55.1125	49.9477	49.5020	51.3045	51.6880	57.2953	60.5078	67.1037	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	90.1209	99.7767	90.1209	93.1249	90.1209	93.1249	90.1209	90.1209	93.1249	90.1209	93.1249	90.1209	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	158.9219	160.5710	156.4153	147.5683	136.4005	125.9044	118.8924	117.2433	121.3990	130.2460	141.4137	151.9099	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)													
	91.1208	89.3110	85.9135	78.5882	74.0760	69.3718	66.5349	68.9577	71.7889	77.0098	84.0386	90.1931	(72)
Total internal gains													
	390.5085	400.0036	382.7946	369.6263	350.9422	338.7460	325.8930	326.6667	336.6576	347.7215	368.9221	382.5687	(73)

---

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	36.7938	0.7600	0.8000	0.7700	83.7154	(77)

Solar gains	83.7154	142.5984	195.1093	241.7499	270.7800	268.8219	259.1730	237.5152	211.2621	157.6016	100.2718	71.6430	(83)
Total gains	474.2239	542.6020	577.9039	611.3762	621.7223	607.5679	585.0660	564.1819	547.9198	505.3230	469.1939	454.2117	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	36.4070	36.6598	36.9110	38.1387	38.3775	39.5297	39.5297	39.7507	39.0778	38.3775	37.8974	37.4082	
alpha	3.4271	3.4440	3.4607	3.5426	3.5585	3.6353	3.6353	3.6500	3.6052	3.5585	3.5265	3.4939	
util living area													
	0.9915	0.9857	0.9764	0.9529	0.9028	0.7877	0.6420	0.6768	0.8532	0.9575	0.9855	0.9927	(86)
MIT	18.8118	19.0472	19.3987	19.9163	20.3749	20.7621	20.9190	20.9003	20.6454	20.0485	19.3802	18.8235	(87)
Th 2	19.3957	19.4047	19.4136	19.4554	19.4633	19.5004	19.5004	19.5073	19.4861	19.4633	19.4474	19.4308	(88)
util rest of house													
	0.9884	0.9805	0.9672	0.9324	0.8539	0.6739	0.4576	0.4996	0.7633	0.9346	0.9792	0.9901	(89)
MIT 2	16.9546	17.2587	17.7092	18.3814	18.9342	19.3644	19.4776	19.4754	19.2516	18.5578	17.7104	16.9904	(90)

Living area fraction											fLA = Living area / (4) =	0.4054	(91)
MIT	17.7076	17.9838	18.3942	19.0037	19.5183	19.9311	20.0620	20.0531	19.8167	19.1622	18.3874	17.7336	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.7076	17.9838	18.3942	19.0037	19.5183	19.9311	20.0620	20.0531	19.8167	19.1622	18.3874	17.7336	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9835	0.9737	0.9589	0.9244	0.8560	0.7115	0.5331	0.5714	0.7870	0.9285	0.9730	0.9858	(94)
Useful gains	466.3862	528.3252	554.1333	565.1521	532.2168	432.2844	311.8931	322.3483	431.2080	469.2127	456.5104	447.7449	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1394.0509	1351.0071	1219.8076	1002.8309	771.1687	510.5137	331.5247	347.8778	553.7697	844.5405	1127.4534	1369.4924	(97)
Space heating kWh	690.1825	552.8422	495.2617	315.1287	177.7802	0.0000	0.0000	0.0000	0.0000	279.2439	483.0790	685.7802	(98a)
Space heating requirement - total per year (kWh/year)												3679.2985	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	690.1825	552.8422	495.2617	315.1287	177.7802	0.0000	0.0000	0.0000	0.0000	279.2439	483.0790	685.7802	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3679.2985	
Space heating per m2											(98c) / (4) =	67.4977	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	690.1825	552.8422	495.2617	315.1287	177.7802	0.0000	0.0000	0.0000	0.0000	279.2439	483.0790	685.7802	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	690.1825	552.8422	495.2617	315.1287	177.7802	0.0000	0.0000	0.0000	0.0000	279.2439	483.0790	685.7802	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4240	13.9782	12.5858	9.2209	7.1225	5.8191	6.4974	8.4455	10.9699	14.3931	16.2570	17.9083	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3679.2985	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1708.0196	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	140.6220	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5527.9400	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3679.2985	0.1544	567.9642	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1708.0196	0.1412	241.0956	(264)

Space and water heating			809.0598	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	140.6220	0.1443	20.2961	(268)
Total CO2, kg/year			829.3559	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			15.2100	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3679.2985	1.5715	5782.0378	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1708.0196	1.5220	2599.5250	(278)
Space and water heating			8381.5628	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	140.6220	1.5338	215.6907	(282)
Total Primary energy kWh/year			8597.2535	(286)
Dwelling Primary energy Rate (DPER)			157.7200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 4	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 4	**Prop Type Ref**	
Property			

SAP Rating	48 E	**DER**	15.21	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.78	**DFEE**	73.97	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	157.72	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b)	x 2.6700	(2b) =	145.5417	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8769	0.8597	0.8425	0.7565	0.7393	0.6534	0.6534	0.6362	0.6877	0.7393	0.7737	0.8081	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.8845	0.8695	0.8549	0.7862	0.7733	0.7134	0.7134	0.7024	0.7365	0.7733	0.7993	0.8265	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
Corridor Wall	47.7400	2.1000	45.6400	0.1800	8.2152			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			124.9800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4996			(33)
Party Ceiling 1			49.9300					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	24.9960	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	61.4956	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	42.4795	41.7624	41.0596	37.7585	37.1408	34.2657	34.2657	33.7332	35.3731	37.1408	38.3903	39.6966	(38)

Heat transfer coeff

	103.9751	103.2580	102.5552	99.2541	98.6364	95.7613	95.7613	95.2288	96.8687	98.6364	99.8859	101.1922 (39)
Average = Sum(39)m / 12 =												99.2511

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9074	1.8943	1.8814	1.8208	1.8095	1.7568	1.7568	1.7470	1.7771	1.8095	1.8324	1.8564	(40)
HLP (average)												1.8208	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8230 (42)

Hot water usage for mixer showers

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)

Hot water usage for baths

	23.6826	23.3309	22.8356	21.9223	21.2385	20.4803	20.0707	20.5625	21.0980	21.9094	22.8414	23.6025 (42b)

Hot water usage for other uses

	33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992 (42c)

Average daily hot water use (litres/day) 52.2295 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	56.9818	55.4192	53.7130	51.5889	49.6942	47.7251	47.3155	49.0182	50.7646	52.7869	54.9298	56.9017	(44)
Energy conte	90.2453	78.9162	82.5549	70.6226	66.8980	58.6836	57.2240	60.6948	62.5979	71.6313	78.2575	89.0944	(45)
Energy content (annual)										Total = Sum(45)m =		867.4204	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	76.7085	67.0788	70.1717	60.0292	56.8633	49.8810	48.6404	51.5906	53.2082	60.8866	66.5189	75.7302	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	76.7085	67.0788	70.1717	60.0292	56.8633	49.8810	48.6404	51.5906	53.2082	60.8866	66.5189	75.7302	(64)
										Total per year (kWh/year) = Sum(64)m =		737.3074	(64)
12Total per year (kWh/year)												737	(64)
Electric shower(s)													
	43.8737	39.0918	42.6868	40.7355	41.4998	39.5868	40.9064	41.4998	40.7355	42.6868	41.8841	43.8737	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		499.0606	(64a)
Heat gains from water heating, kWh/month													
	30.1455	26.5426	28.2146	25.1912	24.5908	22.3670	22.3867	23.2726	23.4859	25.8933	27.1007	29.9010	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	90.1209	99.7767	90.1209	93.1249	90.1209	93.1249	90.1209	90.1209	93.1249	90.1209	93.1249	90.1209	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	158.9219	160.5710	156.4153	147.5683	136.4005	125.9044	118.8924	117.2433	121.3990	130.2460	141.4137	151.9099	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)													
	40.5182	39.4980	37.9229	34.9877	33.0521	31.0652	30.0897	31.2804	32.6193	34.8029	37.6399	40.1895	(72)
Total internal gains													
	339.9058	350.1906	334.8039	326.0258	309.9184	300.4394	289.4477	288.9894	297.4880	305.5146	322.5234	332.5651	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	36.7938	0.7600	0.8000	0.7700	83.7154	(77)

Solar gains	83.7154	142.5984	195.1093	241.7499	270.7800	268.8219	259.1730	237.5152	211.2621	157.6016	100.2718	71.6430	(83)
Total gains	423.6213	492.7889	529.9132	567.7757	580.6984	569.2613	548.6207	526.5046	508.7502	463.1162	422.7952	404.2081	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	36.4070	36.6598	36.9110	38.1387	38.3775	39.5297	39.5297	39.7507	39.0778	38.3775	37.8974	37.4082	
alpha	3.4271	3.4440	3.4607	3.5426	3.5585	3.6353	3.6353	3.6500	3.6052	3.5585	3.5265	3.4939	
util living area													
	0.9940	0.9893	0.9817	0.9616	0.9176	0.8122	0.6713	0.7077	0.8752	0.9667	0.9895	0.9950	(86)
MIT	18.7270	18.9652	19.3222	19.8522	20.3250	20.7335	20.9061	20.8840	20.6062	19.9850	19.3032	18.7386	(87)
Th 2	19.3957	19.4047	19.4136	19.4554	19.4633	19.5004	19.5004	19.5073	19.4861	19.4633	19.4474	19.4308	(88)
util rest of house													
	0.9918	0.9853	0.9744	0.9443	0.8740	0.7031	0.4843	0.5298	0.7926	0.9481	0.9848	0.9931	(89)
MIT 2	17.4093	17.6518	18.0113	18.5590	19.0100	19.3782	19.4791	19.4772	19.2769	18.6994	18.0184	17.4448	(90)
Living area fraction										fLA = Living area / (4) =		0.4054	(91)
MIT	17.9435	18.1843	18.5428	19.0833	19.5432	19.9276	20.0576	20.0475	19.8158	19.2206	18.5393	17.9694	(92)

Temperature adjustment												0.0000	
adjusted MIT	17.9435	18.1843	18.5428	19.0833	19.5432	19.9276	20.0576	20.0475	19.8158	19.2206	18.5393	17.9694	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9888	0.9809	0.9687	0.9387	0.8768	0.7394	0.5613	0.6022	0.8147	0.9441	0.9809	0.9906	(94)
Useful gains	418.8770	483.3969	513.3508	532.9847	509.1745	420.9113	307.9366	317.0767	414.4791	437.2274	414.7106	400.3915	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1418.5882	1371.7143	1235.0522	1010.7334	773.6209	510.1820	331.1047	347.3516	553.6869	850.3062	1142.6250	1393.3515	(97)
Space heating kWh													
	743.7851	596.9493	536.9459	343.9790	196.7481	0.0000	0.0000	0.0000	0.0000	307.3306	524.0984	738.7622	(98a)
Space heating requirement - total per year (kWh/year)												3988.5986	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	743.7851	596.9493	536.9459	343.9790	196.7481	0.0000	0.0000	0.0000	0.0000	307.3306	524.0984	738.7622	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3988.5986	
Space heating per m2											(98c) / (4) =	73.1719	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	900.1558	708.6333	723.7390	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6255	0.7172	0.6904	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	563.0147	508.2231	499.6757	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	625.2956	603.2114	579.1811	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	44.8423	70.6713	59.1520	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction											fC = cooled area / (4) =	1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	11.2106	17.6678	14.7880	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												43.6664	(107)
Energy for space heating												73.1719	(99)
Energy for space cooling												0.8011	(108)
Total												73.9729	(109)
Fabric Energy Efficiency (DFEE)												74.0	(109)

Full SAP Calculation Printout

Property Reference	Apt. 4	Issued on Date	01/10/2024
Assessment Reference	Apt. 4	Prop Type Ref	
Property			

SAP Rating	48 E	DER	15.21	TER	
Environmental	89 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.78	DFEE	73.97	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	157.72	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b)	x 2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8769	0.8597	0.8425	0.7565	0.7393	0.6534	0.6534	0.6362	0.6877	0.7393	0.7737	0.8081	(22b)
Effective ac	0.8845	0.8695	0.8549	0.7862	0.7733	0.7134	0.7134	0.7024	0.7365	0.7733	0.7993	0.8265	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
Corridor Wall	47.7400	2.1000	45.6400	0.1800	8.2152			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			124.9800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4996			(33)
Party Ceiling 1			49.9300					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		24.9960	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	61.4956	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	42.4795	41.7624	41.0596	37.7585	37.1408	34.2657	34.2657	33.7332	35.3731	37.1408	38.3903	39.6966	(38)
Heat transfer coeff	103.9751	103.2580	102.5552	99.2541	98.6364	95.7613	95.7613	95.2288	96.8687	98.6364	99.8859	101.1922	(39)

Average = Sum(39)m / 12 = 99.2511

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9074	1.8943	1.8814	1.8208	1.8095	1.7568	1.7568	1.7470	1.7771	1.8095	1.8324	1.8564	(40)
HLP (average)												1.8208	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8230 (42)

Hot water usage for mixer showers

61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)

Average daily hot water use (litres/day) 87.0022 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)										Total = Sum(45)m =		1445.2196	
Distribution loss (46)m = 0.15 x (45)m													
	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
										Total per year (kWh/year) = Sum(64)m =		1708.0196	(64)
12Total per year (kWh/year)												1708	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	67.7939	60.0170	63.9197	56.5835	55.1125	49.9477	49.5020	51.3045	51.6880	57.2953	60.5078	67.1037	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	90.1209	99.7767	90.1209	93.1249	90.1209	93.1249	90.1209	90.1209	93.1249	90.1209	93.1249	90.1209	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	158.9219	160.5710	156.4153	147.5683	136.4005	125.9044	118.8924	117.2433	121.3990	130.2460	141.4137	151.9099	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)													
	91.1208	89.3110	85.9135	78.5882	74.0760	69.3718	66.5349	68.9577	71.7889	77.0098	84.0386	90.1931	(72)
Total internal gains													
	390.5085	400.0036	382.7946	369.6263	350.9422	338.7460	325.8930	326.6667	336.6576	347.7215	368.9221	382.5687	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	36.7938	0.7600	0.8000	0.7700	83.7154	(77)

Solar gains	83.7154	142.5984	195.1093	241.7499	270.7800	268.8219	259.1730	237.5152	211.2621	157.6016	100.2718	71.6430	(83)
Total gains	474.2239	542.6020	577.9039	611.3762	621.7223	607.5679	585.0660	564.1819	547.9198	505.3230	469.1939	454.2117	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	36.4070	36.6598	36.9110	38.1387	38.3775	39.5297	39.5297	39.7507	39.0778	38.3775	37.8974	37.4082	
alpha	3.4271	3.4440	3.4607	3.5426	3.5585	3.6353	3.6353	3.6500	3.6052	3.5585	3.5265	3.4939	
util living area													
	0.9915	0.9857	0.9764	0.9529	0.9028	0.7877	0.6420	0.6768	0.8532	0.9575	0.9855	0.9927	(86)
MIT	18.8118	19.0472	19.3987	19.9163	20.3749	20.7621	20.9190	20.9003	20.6454	20.0485	19.3802	18.8235	(87)
Th 2	19.3957	19.4047	19.4136	19.4554	19.4633	19.5004	19.5004	19.5073	19.4861	19.4633	19.4474	19.4308	(88)
util rest of house													
	0.9884	0.9805	0.9672	0.9324	0.8539	0.6739	0.4576	0.4996	0.7633	0.9346	0.9792	0.9901	(89)
MIT 2	16.9546	17.2587	17.7092	18.3814	18.9342	19.3644	19.4776	19.4754	19.2516	18.5578	17.7104	16.9904	(90)

Living area fraction											fLA = Living area / (4) =	0.4054	(91)
MIT	17.7076	17.9838	18.3942	19.0037	19.5183	19.9311	20.0620	20.0531	19.8167	19.1622	18.3874	17.7336	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.7076	17.9838	18.3942	19.0037	19.5183	19.9311	20.0620	20.0531	19.8167	19.1622	18.3874	17.7336	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9835	0.9737	0.9589	0.9244	0.8560	0.7115	0.5331	0.5714	0.7870	0.9285	0.9730	0.9858	(94)
Useful gains	466.3862	528.3252	554.1333	565.1521	532.2168	432.2844	311.8931	322.3483	431.2080	469.2127	456.5104	447.7449	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1394.0509	1351.0071	1219.8076	1002.8309	771.1687	510.5137	331.5247	347.8778	553.7697	844.5405	1127.4534	1369.4924	(97)
Space heating kWh	690.1825	552.8422	495.2617	315.1287	177.7802	0.0000	0.0000	0.0000	0.0000	279.2439	483.0790	685.7802	(98a)
Space heating requirement - total per year (kWh/year)												3679.2985	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	690.1825	552.8422	495.2617	315.1287	177.7802	0.0000	0.0000	0.0000	0.0000	279.2439	483.0790	685.7802	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3679.2985	
Space heating per m2											(98c) / (4) =	67.4977	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	690.1825	552.8422	495.2617	315.1287	177.7802	0.0000	0.0000	0.0000	0.0000	279.2439	483.0790	685.7802	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	690.1825	552.8422	495.2617	315.1287	177.7802	0.0000	0.0000	0.0000	0.0000	279.2439	483.0790	685.7802	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4240	13.9782	12.5858	9.2209	7.1225	5.8191	6.4974	8.4455	10.9699	14.3931	16.2570	17.9083	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3679.2985	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1708.0196	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	140.6220	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5527.9400	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3679.2985	0.1544	567.9642	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1708.0196	0.1412	241.0956	(264)

Space and water heating			809.0598	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	140.6220	0.1443	20.2961	(268)
Total CO2, kg/year			829.3559	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			15.2100	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3679.2985	1.5715	5782.0378	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1708.0196	1.5220	2599.5250	(278)
Space and water heating			8381.5628	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	140.6220	1.5338	215.6907	(282)
Total Primary energy kWh/year			8597.2535	(286)
Dwelling Primary energy Rate (DPER)			157.7200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 4	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 4	**Prop Type Ref**	
Property			

SAP Rating	48 E	**DER**	15.21	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.78	**DFEE**	73.97	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	157.72	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b)	x 2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8874 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8769	0.8597	0.8425	0.7565	0.7393	0.6534	0.6534	0.6362	0.6877	0.7393	0.7737	0.8081	(22b)
Effective ac	0.8845	0.8695	0.8549	0.7862	0.7733	0.7134	0.7134	0.7024	0.7365	0.7733	0.7993	0.8265	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
Corridor Wall	47.7400	2.1000	45.6400	0.1800	8.2152			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			124.9800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4996			(33)
Party Ceiling 1			49.9300					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	24.9960	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 61.4956	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	42.4795	41.7624	41.0596	37.7585	37.1408	34.2657	34.2657	33.7332	35.3731	37.1408	38.3903	39.6966	(38)
Heat transfer coeff	103.9751	103.2580	102.5552	99.2541	98.6364	95.7613	95.7613	95.2288	96.8687	98.6364	99.8859	101.1922	(39)

Average = Sum(39)m / 12 = 99.2511

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9074	1.8943	1.8814	1.8208	1.8095	1.7568	1.7568	1.7470	1.7771	1.8095	1.8324	1.8564	(40)
HLP (average)												1.8208	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8230 (42)

Hot water usage for mixer showers

61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)

Average daily hot water use (litres/day) 87.0022 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)										Total = Sum(45)m =		1445.2196	
Distribution loss (46)m = 0.15 x (45)m	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)

Water storage loss:

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.7200 (55)

Total storage loss

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
									Total per year (kWh/year) = Sum(64)m =		1708.0196	(64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)

Heat gains from water heating, kWh/month

67.7939	60.0170	63.9197	56.5835	55.1125	49.9477	49.5020	51.3045	51.6880	57.2953	60.5078	67.1037	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.9065	17.6808	14.3790	10.8858	8.1373	6.8698	7.4231	9.6488	12.9506	16.4438	19.1923	20.4598	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	237.1969	239.6583	233.4557	220.2512	203.5829	187.9170	177.4513	174.9899	181.1925	194.3970	211.0653	226.7311	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)	91.1208	89.3110	85.9135	78.5882	74.0760	69.3718	66.5349	68.9577	71.7889	77.0098	84.0386	90.1931	(72)
Total internal gains	432.4449	430.8707	417.9689	393.9459	370.0168	348.3793	335.6299	337.8171	350.1527	372.0712	398.5169	421.6047	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	36.7938	0.7600	0.8000	0.7700	83.7154	(77)

Solar gains	83.7154	142.5984	195.1093	241.7499	270.7800	268.8219	259.1730	237.5152	211.2621	157.6016	100.2718	71.6430	(83)
Total gains	516.1603	573.4691	613.0782	635.6958	640.7969	617.2012	594.8030	575.3323	561.4148	529.6728	498.7887	493.2477	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	36.4070	36.6598	36.9110	38.1387	38.3775	39.5297	39.5297	39.7507	39.0778	38.3775	37.8974	37.4082	
alpha	3.4271	3.4440	3.4607	3.5426	3.5585	3.6353	3.6353	3.6500	3.6052	3.5585	3.5265	3.4939	
util living area	0.9890	0.9831	0.9721	0.9477	0.8955	0.7815	0.6344	0.6679	0.8454	0.9516	0.9825	0.9906	(86)
MIT	18.8814	19.0973	19.4536	19.9511	20.3970	20.7688	20.9221	20.9046	20.6580	20.0839	19.4287	18.8892	(87)
Th 2	19.3957	19.4047	19.4136	19.4554	19.4633	19.5004	19.5004	19.5073	19.4861	19.4633	19.4474	19.4308	(88)
util rest of house	0.9850	0.9771	0.9614	0.9253	0.8443	0.6667	0.4509	0.4912	0.7533	0.9262	0.9751	0.9872	(89)
MIT 2	17.0426	17.3216	17.7770	18.4222	18.9571	19.3692	19.4787	19.4771	19.2623	18.5990	17.7709	17.0736	(90)
Living area fraction									fLA = Living area / (4) =			0.4054	(91)

MIT	17.7881	18.0415	18.4567	19.0421	19.5409	19.9367	20.0639	20.0558	19.8281	19.2011	18.4430	17.8097	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.7881	18.0415	18.4567	19.0421	19.5409	19.9367	20.0639	20.0558	19.8281	19.2011	18.4430	17.8097	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9792	0.9696	0.9524	0.9175	0.8475	0.7050	0.5260	0.5628	0.7782	0.9204	0.9682	0.9821	(94)
Useful gains	505.4206	556.0399	583.9161	583.2202	543.0766	435.1393	312.8908	323.8136	436.9189	487.5283	482.9361	484.4007	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1402.4307	1356.9685	1226.2269	1006.6428	773.3972	511.0443	331.7058	348.1413	554.8781	848.3779	1133.0049	1377.1962	(97)
Space heating kWh													
	667.3755	538.2240	477.8792	304.8643	171.3585	0.0000	0.0000	0.0000	0.0000	268.4722	468.0495	664.2398	(98a)
Space heating requirement - total per year (kWh/year)												3560.4631	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	667.3755	538.2240	477.8792	304.8643	171.3585	0.0000	0.0000	0.0000	0.0000	268.4722	468.0495	664.2398	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3560.4631	
Space heating per m2											(98c) / (4) =	65.3176	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	667.3755	538.2240	477.8792	304.8643	171.3585	0.0000	0.0000	0.0000	0.0000	268.4722	468.0495	664.2398	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	667.3755	538.2240	477.8792	304.8643	171.3585	0.0000	0.0000	0.0000	0.0000	268.4722	468.0495	664.2398	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4240	13.9782	12.5858	9.2209	7.1225	5.8191	6.4974	8.4455	10.9699	14.3931	16.2570	17.9083	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3560.4631	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1708.0196	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	140.6220	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5409.1047	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3560.4631	16.4900	587.1204	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1708.0196	16.4900	281.6524	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	140.6220	16.4900	23.1886	(250)
Additional standing charges			0.0000	(251)
Total energy cost			891.9614	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.2269	(257)
SAP value		47.6924	
SAP rating (Section 12)		48	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3560.4631	0.1544	549.6873	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1708.0196	0.1412	241.0956	(264)
Space and water heating			790.7829	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	140.6220	0.1443	20.2961	(268)
Total CO2, kg/year			811.0790	(272)
CO2 emissions per m2			14.8800	(273)
EI value			89.0780	
EI rating			89	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b) x	2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8253	0.8081	0.7909	0.7221	0.7049	0.6362	0.6362	0.6362	0.6362	0.7221	0.7393	0.7737	(22b)
Effective ac	0.8406	0.8265	0.8128	0.7607	0.7485	0.7024	0.7024	0.7024	0.7024	0.7607	0.7733	0.7993	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
Corridor Wall	47.7400	2.1000	45.6400	0.1800	8.2152			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			124.9800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4996			(33)

Party Ceiling 1						49.9300							(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K												250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)												24.9960	(36)
Point Thermal bridges											(36a) =	0.0000	
Total fabric heat loss											(33) + (36) + (36a) =	61.4956	(37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	40.3710	39.6966	39.0363	36.5374	35.9482	33.7332	33.7332	33.7332	33.7332	36.5374	37.1408	38.3903	(38)
Heat transfer coeff	101.8666	101.1922	100.5319	98.0330	97.4438	95.2288	95.2288	95.2288	95.2288	98.0330	98.6364	99.8859	(39)
Average = Sum(39)m / 12 =												98.0448	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8688	1.8564	1.8443	1.7984	1.7876	1.7470	1.7470	1.7470	1.7470	1.7984	1.8095	1.8324	(40)
HLP (average)												1.7987	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8230	(42)
Hot water usage for mixer showers													
	61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)
Average daily hot water use (litres/day)												87.0022	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)											Total = Sum(45)m =	1445.2196	
Distribution loss (46)m = 0.15 x (45)m													
	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
										Total per year (kWh/year) = Sum(64)m =		1708.0196	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	67.7939	60.0170	63.9197	56.5835	55.1125	49.9477	49.5020	51.3045	51.6880	57.2953	60.5078	67.1037	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.9065	17.6808	14.3790	10.8858	8.1373	6.8698	7.4231	9.6488	12.9506	16.4438	19.1923	20.4598	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	237.1969	239.6583	233.4557	220.2512	203.5829	187.9170	177.4513	174.9899	181.1925	194.3970	211.0653	226.7311	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)	91.1208	89.3110	85.9135	78.5882	74.0760	69.3718	66.5349	68.9577	71.7889	77.0098	84.0386	90.1931	(72)
Total internal gains	432.4449	430.8707	417.9689	393.9459	370.0168	348.3793	335.6299	337.8171	350.1527	372.0712	398.5169	421.6047	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	33.9635	0.7600	0.8000	0.7700	77.2758	(77)

Solar gains	77.2758	134.6762	193.0769	244.9732	269.3697	272.8542	255.0591	229.9510	211.2621	155.2137	94.1947	68.2314	(83)
Total gains	509.7207	565.5470	611.0458	638.9192	639.3865	621.2336	590.6891	567.7681	561.4148	527.2849	492.7116	489.8361	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.1605	37.4082	37.6539	38.6137	38.8472	39.7507	39.7507	39.7507	39.7507	38.6137	38.3775	37.8974	
alpha	3.4774	3.4939	3.5103	3.5742	3.5898	3.6500	3.6500	3.6500	3.6500	3.5742	3.5585	3.5265	
util living area													
	0.9885	0.9827	0.9709	0.9438	0.8862	0.7711	0.6559	0.6836	0.8420	0.9506	0.9815	0.9900	(86)
MIT	18.9889	19.1826	19.5259	20.0088	20.4531	20.7855	20.9102	20.8946	20.6730	20.1056	19.5112	18.9829	(87)
Th 2	19.4223	19.4308	19.4392	19.4711	19.4787	19.5073	19.5073	19.5073	19.5073	19.4711	19.4633	19.4474	(88)
util rest of house													
	0.9844	0.9765	0.9596	0.9198	0.8302	0.6530	0.4801	0.5106	0.7498	0.9246	0.9735	0.9864	(89)
MIT 2	17.1955	17.4458	17.8838	18.5028	19.0311	19.3887	19.4792	19.4719	19.2935	18.6308	17.8855	17.2032	(90)
Living area fraction										fLA = Living area / (4) =		0.4054	(91)
MIT	17.9226	18.1500	18.5495	19.1134	19.6076	19.9550	20.0594	20.0487	19.8528	19.2287	18.5446	17.9248	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.9226	18.1500	18.5495	19.1134	19.6076	19.9550	20.0594	20.0487	19.8528	19.2287	18.5446	17.9248	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9785	0.9691	0.9508	0.9125	0.8359	0.6934	0.5514	0.5802	0.7752	0.9191	0.9666	0.9812	(94)
Useful gains	498.7822	548.0836	580.9955	583.0161	534.4927	430.7345	325.7024	329.4377	435.2265	484.6189	476.2399	480.6193	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1346.9403	1310.4349	1191.2581	981.6419	741.3169	500.4275	348.4809	356.9868	547.8285	836.0974	1089.4006	1330.9583	(97)
Space heating kWh													
	631.0296	512.3001	454.0353	287.0106	153.8772	0.0000	0.0000	0.0000	0.0000	261.5000	441.4758	632.6522	(98a)
Space heating requirement - total per year (kWh/year)												3373.8807	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	631.0296	512.3001	454.0353	287.0106	153.8772	0.0000	0.0000	0.0000	0.0000	261.5000	441.4758	632.6522	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3373.8807	
Space heating per m2											(98c) / (4) =	61.8947	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	631.0296	512.3001	454.0353	287.0106	153.8772	0.0000	0.0000	0.0000	0.0000	261.5000	441.4758	632.6522	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	631.0296	512.3001	454.0353	287.0106	153.8772	0.0000	0.0000	0.0000	0.0000	261.5000	441.4758	632.6522	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4240	13.9782	12.5858	9.2209	7.1225	5.8191	6.4974	8.4455	10.9699	14.3931	16.2570	17.9083	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3373.8807	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1708.0196	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	140.6220	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5222.5223	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3373.8807	26.0600	879.2333	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1708.0196	26.0600	445.1099	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	140.6220	26.0600	36.6461	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1360.9893	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3373.8807	0.1544	520.9967	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1708.0196	0.1412	241.0956	(264)
Space and water heating			762.0923	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	140.6220	0.1443	20.2961	(268)
Total CO2, kg/year			782.3884	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3373.8807	1.5717	5302.7618	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1708.0196	1.5220	2599.5250	(278)
Space and water heating			7902.2867	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	140.6220	1.5338	215.6907	(282)
Total Primary energy kWh/year			8117.9774	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 4

Current energy efficiency rating: E 48
Current environmental impact rating: B 89

N Solar water heating Not applicable
U Solar photovoltaic panels Not applicable
V2 Wind turbine Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 48
Potential environmental impact rating: B 89

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£1361	£1361	£0
Space heating	£879	£879	£0
Water heating	£445	£445	£0
Lighting	£37	£37	£0
Total cost of fuels	£1361	£1361	£0
Total cost of uses	£1361	£1361	£0
Delivered energy	96 kWh/m²	96 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m²	14 kg/m²	14 kg/m²	0 kg/m²
Primary energy	149 kWh/m²	149 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b)	x 2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8769	0.8597	0.8425	0.7565	0.7393	0.6534	0.6534	0.6362	0.6877	0.7393	0.7737	0.8081	(22b)
Effective ac	0.8845	0.8695	0.8549	0.7862	0.7733	0.7134	0.7134	0.7024	0.7365	0.7733	0.7993	0.8265	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
Corridor Wall	47.7400	2.1000	45.6400	0.1800	8.2152			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			124.9800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4996			(33)
Party Ceiling 1			49.9300					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	24.9960	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	61.4956	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	42.4795	41.7624	41.0596	37.7585	37.1408	34.2657	34.2657	33.7332	35.3731	37.1408	38.3903	39.6966	(38)
Heat transfer coeff	103.9751	103.2580	102.5552	99.2541	98.6364	95.7613	95.7613	95.2288	96.8687	98.6364	99.8859	101.1922	(39)
Average = Sum(39)m / 12 =												99.2511	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9074	1.8943	1.8814	1.8208	1.8095	1.7568	1.7568	1.7470	1.7771	1.8095	1.8324	1.8564	(40)
HLP (average)												1.8208	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.8230 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)
Average daily hot water use (litres/day)												87.0022	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)										Total = Sum(45)m =		1445.2196	
Distribution loss (46)m = 0.15 x (45)m	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)

Water storage loss:	
Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2000 (48)
Temperature factor from Table 2b	0.6000 (49)
Enter (49) or (54) in (55)	0.7200 (55)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)

Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)

Output from w/h

	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333 (64)

Total per year (kWh/year) = Sum(64)m = 1708.0196 (64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

	67.7939	60.0170	63.9197	56.5835	55.1125	49.9477	49.5020	51.3045	51.6880	57.2953	60.5078	67.1037 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	19.9065	17.6808	14.3790	10.8858	8.1373	6.8698	7.4231	9.6488	12.9506	16.4438	19.1923	20.4598 (67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	237.1969	239.6583	233.4557	220.2512	203.5829	187.9170	177.4513	174.9899	181.1925	194.3970	211.0653	226.7311 (68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)

Losses e.g. evaporation (negative values) (Table 5)

	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195 (71)

Water heating gains (Table 5)

	91.1208	89.3110	85.9135	78.5882	74.0760	69.3718	66.5349	68.9577	71.7889	77.0098	84.0386	90.1931 (72)

Total internal gains

	432.4449	430.8707	417.9689	393.9459	370.0168	348.3793	335.6299	337.8171	350.1527	372.0712	398.5169	421.6047 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	36.7938	0.7600	0.8000	0.7700	83.7154	(77)

Solar gains	83.7154	142.5984	195.1093	241.7499	270.7800	268.8219	259.1730	237.5152	211.2621	157.6016	100.2718	71.6430	(83)
Total gains	516.1603	573.4691	613.0782	635.6958	640.7969	617.2012	594.8030	575.3323	561.4148	529.6728	498.7887	493.2477	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	36.4070	36.6598	36.9110	38.1387	38.3775	39.5297	39.5297	39.7507	39.0778	38.3775	37.8974	37.4082	
alpha	3.4271	3.4440	3.4607	3.5426	3.5585	3.6353	3.6353	3.6500	3.6052	3.5585	3.5265	3.4939	
util living area	0.9890	0.9831	0.9721	0.9477	0.8955	0.7815	0.6344	0.6679	0.8454	0.9516	0.9825	0.9906	(86)
MIT	18.8814	19.0973	19.4536	19.9511	20.3970	20.7688	20.9221	20.9046	20.6580	20.0839	19.4287	18.8892	(87)
Th 2	19.3957	19.4047	19.4136	19.4554	19.4633	19.5004	19.5004	19.5073	19.4861	19.4633	19.4474	19.4308	(88)
util rest of house	0.9850	0.9771	0.9614	0.9253	0.8443	0.6667	0.4509	0.4912	0.7533	0.9262	0.9751	0.9872	(89)
MIT 2	17.0426	17.3216	17.7770	18.4222	18.9571	19.3692	19.4787	19.4771	19.2623	18.5990	17.7709	17.0736	(90)
Living area fraction									fLA = Living area / (4) =			0.4054	(91)
MIT	17.7881	18.0415	18.4567	19.0421	19.5409	19.9367	20.0639	20.0558	19.8281	19.2011	18.4430	17.8097	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.7881	18.0415	18.4567	19.0421	19.5409	19.9367	20.0639	20.0558	19.8281	19.2011	18.4430	17.8097	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9792	0.9696	0.9524	0.9175	0.8475	0.7050	0.5260	0.5628	0.7782	0.9204	0.9682	0.9821	(94)
Useful gains	505.4206	556.0399	583.9161	583.2202	543.0766	435.1393	312.8908	323.8136	436.9189	487.5283	482.9361	484.4007	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1402.4307	1356.9685	1226.2269	1006.6428	773.3972	511.0443	331.7058	348.1413	554.8781	848.3779	1133.0049	1377.1962	(97)
Space heating kWh	667.3755	538.2240	477.8792	304.8643	171.3585	0.0000	0.0000	0.0000	0.0000	268.4722	468.0495	664.2398	(98a)
Space heating requirement - total per year (kWh/year)												3560.4631	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	667.3755	538.2240	477.8792	304.8643	171.3585	0.0000	0.0000	0.0000	0.0000	268.4722	468.0495	664.2398	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3560.4631	
Space heating per m2											(98c) / (4) =	65.3176	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	667.3755	538.2240	477.8792	304.8643	171.3585	0.0000	0.0000	0.0000	0.0000	268.4722	468.0495	664.2398	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	667.3755	538.2240	477.8792	304.8643	171.3585	0.0000	0.0000	0.0000	0.0000	268.4722	468.0495	664.2398	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4240	13.9782	12.5858	9.2209	7.1225	5.8191	6.4974	8.4455	10.9699	14.3931	16.2570	17.9083	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3560.4631	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1708.0196	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	140.6220	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5409.1047	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3560.4631	16.4900	587.1204	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1708.0196	16.4900	281.6524	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	140.6220	16.4900	23.1886	(250)
Additional standing charges			0.0000	(251)
Total energy cost			891.9614	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.2269	(257)
SAP value		47.6924	
SAP rating (Section 12)		48	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3560.4631	0.1544	549.6873	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1708.0196	0.1412	241.0956	(264)
Space and water heating			790.7829	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	140.6220	0.1443	20.2961	(268)
Total CO2, kg/year			811.0790	(272)
CO2 emissions per m2			14.8800	(273)
EI value			89.0780	
EI rating			89	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b)	x 2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8874 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8253	0.8081	0.7909	0.7221	0.7049	0.6362	0.6362	0.6362	0.6362	0.7221	0.7393	0.7737	(22b)
Effective ac	0.8406	0.8265	0.8128	0.7607	0.7485	0.7024	0.7024	0.7024	0.7024	0.7607	0.7733	0.7993	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
Corridor Wall	47.7400	2.1000	45.6400	0.1800	8.2152			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			124.9800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4996			(33)
Party Ceiling 1			49.9300					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)	24.9960 (36)
Point Thermal bridges (36a) =	0.0000
Total fabric heat loss (33) + (36) + (36a) =	61.4956 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	40.3710	39.6966	39.0363	36.5374	35.9482	33.7332	33.7332	33.7332	33.7332	36.5374	37.1408	38.3903	(38)
Heat transfer coeff	101.8666	101.1922	100.5319	98.0330	97.4438	95.2288	95.2288	95.2288	95.2288	98.0330	98.6364	99.8859	(39)
Average = Sum(39)m / 12 =												98.0448	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8688	1.8564	1.8443	1.7984	1.7876	1.7470	1.7470	1.7470	1.7470	1.7984	1.8095	1.8324	(40)
HLP (average)												1.7987	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8230	(42)
Hot water usage for mixer showers	61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)
Average daily hot water use (litres/day)												87.0022	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)

Energy content (annual)											Total = Sum(45)m =	1445.2196	
Distribution loss (46)m = 0.15 x (45)m													
	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
										Total per year (kWh/year) = Sum(64)m =		1708.0196	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	67.7939	60.0170	63.9197	56.5835	55.1125	49.9477	49.5020	51.3045	51.6880	57.2953	60.5078	67.1037	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.9065	17.6808	14.3790	10.8858	8.1373	6.8698	7.4231	9.6488	12.9506	16.4438	19.1923	20.4598	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	237.1969	239.6583	233.4557	220.2512	203.5829	187.9170	177.4513	174.9899	181.1925	194.3970	211.0653	226.7311	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)													
	91.1208	89.3110	85.9135	78.5882	74.0760	69.3718	66.5349	68.9577	71.7889	77.0098	84.0386	90.1931	(72)
Total internal gains													
	432.4449	430.8707	417.9689	393.9459	370.0168	348.3793	335.6299	337.8171	350.1527	372.0712	398.5169	421.6047	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	33.9635	0.7600	0.8000	0.7700	77.2758	(77)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	77.2758	134.6762	193.0769	244.9732	269.3697	272.8542	255.0591	229.9510	211.2621	155.2137	94.1947	68.2314	(83)
Total gains	509.7207	565.5470	611.0458	638.9192	639.3865	621.2336	590.6891	567.7681	561.4148	527.2849	492.7116	489.8361	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.1605	37.4082	37.6539	38.6137	38.8472	39.7507	39.7507	39.7507	39.7507	38.6137	38.3775	37.8974	
alpha	3.4774	3.4939	3.5103	3.5742	3.5898	3.6500	3.6500	3.6500	3.6500	3.5742	3.5585	3.5265	
util living area													
	0.9885	0.9827	0.9709	0.9438	0.8862	0.7711	0.6559	0.6836	0.8420	0.9506	0.9815	0.9900	(86)
MIT	18.9889	19.1826	19.5259	20.0088	20.4531	20.7855	20.9102	20.8946	20.6730	20.1056	19.5112	18.9829	(87)
Th 2	19.4223	19.4308	19.4392	19.4711	19.4787	19.5073	19.5073	19.5073	19.5073	19.4711	19.4633	19.4474	(88)
util rest of house													
	0.9844	0.9765	0.9596	0.9198	0.8302	0.6530	0.4801	0.5106	0.7498	0.9246	0.9735	0.9864	(89)
MIT 2	17.1955	17.4458	17.8838	18.5028	19.0311	19.3887	19.4792	19.4719	19.2935	18.6308	17.8855	17.2032	(90)
Living area fraction										fLA = Living area / (4) =		0.4054	(91)
MIT	17.9226	18.1500	18.5495	19.1134	19.6076	19.9550	20.0594	20.0487	19.8528	19.2287	18.5446	17.9248	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.9226	18.1500	18.5495	19.1134	19.6076	19.9550	20.0594	20.0487	19.8528	19.2287	18.5446	17.9248	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9785	0.9691	0.9508	0.9125	0.8359	0.6934	0.5514	0.5802	0.7752	0.9191	0.9666	0.9812	(94)
Useful gains	498.7822	548.0836	580.9955	583.0161	534.4927	430.7345	325.7024	329.4377	435.2265	484.6189	476.2399	480.6193	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1346.9403	1310.4349	1191.2581	981.6419	741.3169	500.4275	348.4809	356.9868	547.8285	836.0974	1089.4006	1330.9583	(97)
Space heating kWh													
	631.0296	512.3001	454.0353	287.0106	153.8772	0.0000	0.0000	0.0000	0.0000	261.5000	441.4758	632.6522	(98a)
Space heating requirement - total per year (kWh/year)												3373.8807	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	631.0296	512.3001	454.0353	287.0106	153.8772	0.0000	0.0000	0.0000	0.0000	261.5000	441.4758	632.6522	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3373.8807	
Space heating per m2											(98c) / (4) =	61.8947	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	631.0296	512.3001	454.0353	287.0106	153.8772	0.0000	0.0000	0.0000	0.0000	261.5000	441.4758	632.6522	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	631.0296	512.3001	454.0353	287.0106	153.8772	0.0000	0.0000	0.0000	0.0000	261.5000	441.4758	632.6522	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	172.5091	152.1570	160.8573	139.8061	134.3697	119.8487	117.4958	122.9171	125.0828	140.9343	151.6084	170.4333	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.4240	13.9782	12.5858	9.2209	7.1225	5.8191	6.4974	8.4455	10.9699	14.3931	16.2570	17.9083	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3373.8807	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1708.0196	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												140.6220	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5222.5223	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3373.8807	26.0600	879.2333	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1708.0196	26.0600	445.1099	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	140.6220	26.0600	36.6461	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1360.9893	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3373.8807	0.1544	520.9967	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1708.0196	0.1412	241.0956	(264)
Space and water heating			762.0923	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	140.6220	0.1443	20.2961	(268)
Total CO2, kg/year			782.3884	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3373.8807	1.5717	5302.7618	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1708.0196	1.5220	2599.5250	(278)
Space and water heating			7902.2867	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	140.6220	1.5338	215.6907	(282)
Total Primary energy kWh/year			8117.9774	(286)

Predicted Energy Assessment

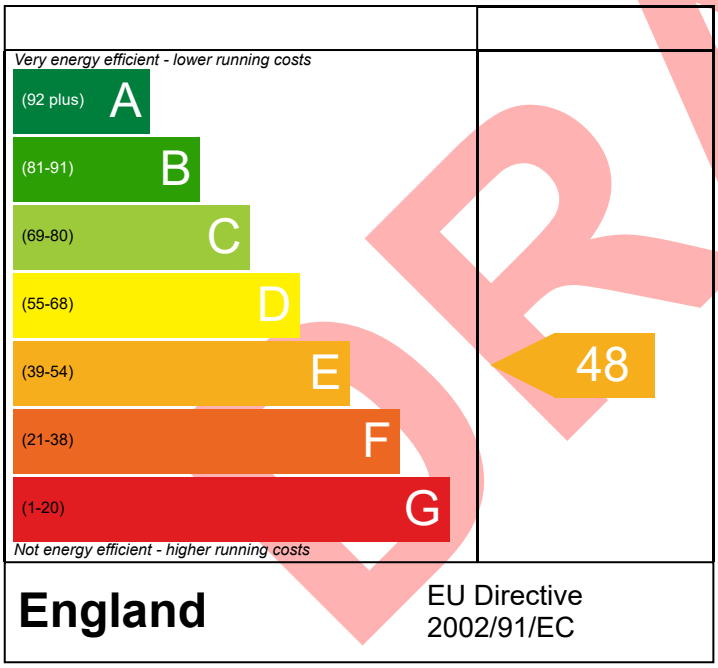
elmhurst energy

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	54.51 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

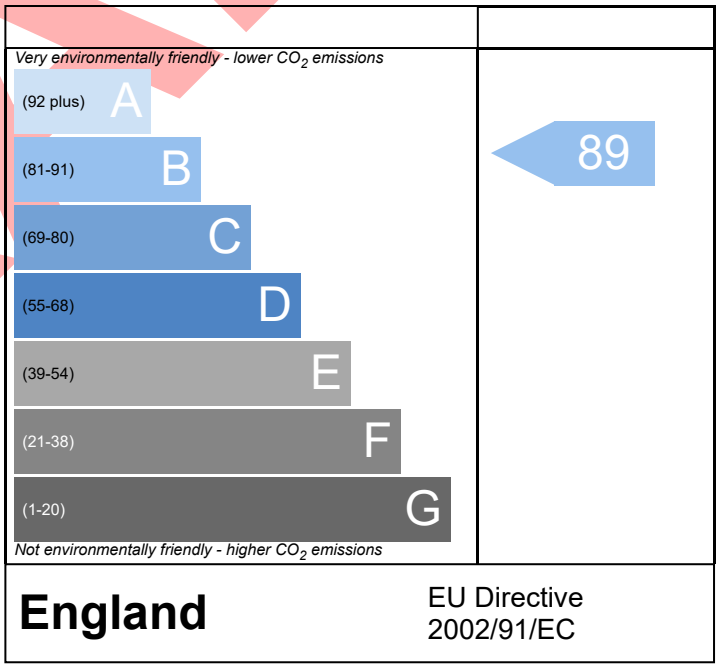
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

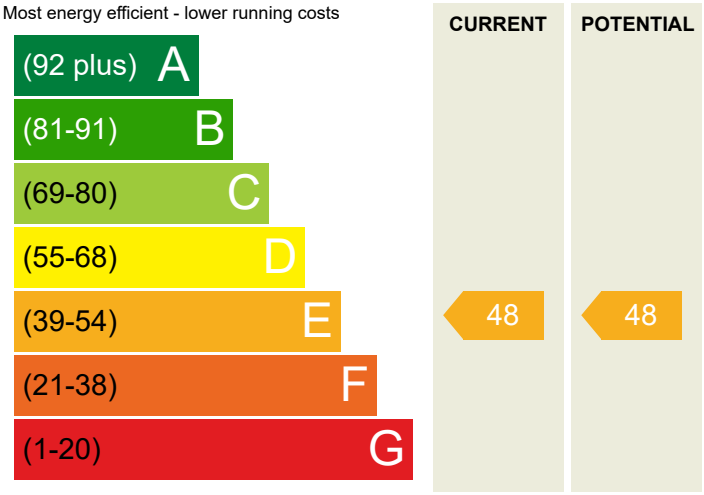
Energy Report

Dwelling Address	
Reference	Apt. 4-Apt. 4
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	55

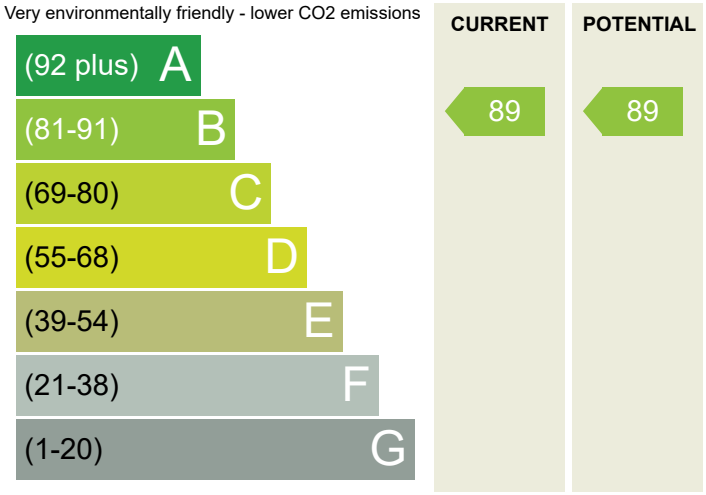
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

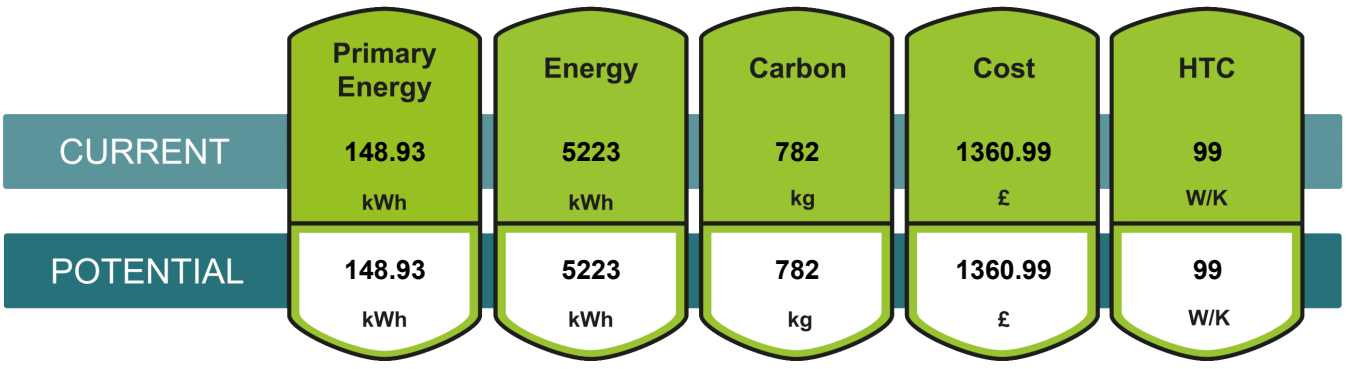
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.21 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£37	£37	
Heating	£879	£879	
Hot Water	£445	£445	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1361	£1361	

Estimated energy use and potential savings

Space Heating
3374
kWh per year

Water Heating
1708
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 4	Issued on Date	01/10/2024
Assessment Reference	Apt. 4	Prop Type Ref	Detached Flat
Property			

SAP Rating	48 E	DER	15.21	TER	
Environmental	89 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.78	DFEE	73.97	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	157.72	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	18.15	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	47.74	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	4.58	m²	

Comments

Heat Loss Floors

Description	Heatloss Floor 1		
Type	Ground Floor - Solid		
Construction	Other		
U-value	0.25	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	54.51	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SE1	New Glazing	External Wall 1	South East	5.40
D NW	New Door	Corridor Wall	North West	2.10

Comments

Thermal Bridging Default

Y-value	0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing	No
Property Tested?	Yes
Test Method	Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System	No

Comments

Lighting

No Fixed Lighting	No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	100.00	10.00	1000.00	10

Comments

Main Heating 1	SAP table	
Fuel Type	Electricity	
Winter Efficiency		%
Summer Efficiency		%
Model Name		
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue	No	
Heat Emitter		
Flow Temperature		
Flow Temperature Value		

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	Hot Water Cylinder	
Independent Time Control	No	
Cylinder Stat	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day

Pipes insulation

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 5	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 5	**Prop Type Ref**	
Property			

SAP Rating	45 E	**DER**	15.24	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.9	**DFEE**	77.28	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	157.56	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	24.33 m	63.10 m²	2.67 m

8.0 Living Area	21.91	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	60.39	50.00	0.00	None	10.39	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	4.57	2.47	0.00	None	2.10	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	5.16	5.16	None	0.00	Enter Gross Area	0.00

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	57.94

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Other	0.25	None	0.00	0.00	63.10

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40

Summary for Input Data

New Door	Manufacturer	Solid Door					0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled		0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SE1	New Glazing	External Wall 1	South East	4.04	0
D NW	New Door	Corridor Wall	North West	2.10	0
W SW1	New Glazing	External Wall 1	South West	5.90	0
W NW1	New Glazing	External Wall 1	North West	0.45	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0
21.0 Fixed Cooling System	No
22.0 Pressure Testing	No
Property Tested?	Yes
Test Method	Blower Door

22.0 Lighting

No Fixed Lighting	No				
	Name	**Efficacy**	**Power**	**Capacity**	**Count**
	Lighting 1	100.00	10.00	1000.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

Summary for Input Data

elmhurst energy

27.0 Secondary Heating	None
28.0 Water Heating	
Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 5	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 5	**Prop Type Ref**	
Property			

SAP Rating	45 E	**DER**	15.24	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.9	**DFEE**	77.28	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	157.56	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		168.4770	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8687 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0245	1.0044	0.9844	0.8839	0.8638	0.7634	0.7634	0.7433	0.8036	0.8638	0.9040	0.9442	(22b)
Effective ac	1.0245	1.0044	0.9845	0.8907	0.8731	0.7914	0.7914	0.7762	0.8229	0.8731	0.9086	0.9457	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
Corridor Wall	4.5700	2.1000	2.4700	0.1800	0.4446			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			133.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		48.7598			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		26.6440 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	75.4038 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	56.9615	55.8446	54.7345	49.5179	48.5419	43.9983	43.9983	43.1570	45.7484	48.5419	50.5163	52.5806	(38)
Heat transfer coeff	132.3653	131.2485	130.1384	124.9217	123.9457	119.4022	119.4022	118.5608	121.1523	123.9457	125.9202	127.9844	(39)

Average = Sum(39)m / 12 = 124.9156

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0977	2.0800	2.0624	1.9797	1.9643	1.8923	1.8923	1.8789	1.9200	1.9643	1.9956	2.0283	(40)
HLP (average)												1.9796	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.0678 (42)

Hot water usage for mixer showers

66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)

Average daily hot water use (litres/day) 93.5492 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)										Total = Sum(45)m =		1553.9731	
Distribution loss (46)m = 0.15 x (45)m	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
										Total per year (kWh/year) = Sum(64)m =		1816.7731	(64)
12Total per year (kWh/year)												1817	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	71.5517	63.3197	67.3860	59.5411	57.9161	52.4059	51.8833	53.8216	54.2772	60.2631	63.7607	70.8096	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	92.4673	102.3745	92.4673	95.5495	92.4673	95.5495	92.4673	92.4673	95.5495	92.4673	95.5495	92.4673	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	180.6921	182.5671	177.8421	167.7832	155.0856	143.1516	135.1790	133.3040	138.0290	148.0879	160.7855	172.7194	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)	96.1717	94.2257	90.5725	82.6960	77.8442	72.7860	69.7357	72.3408	75.3851	80.9988	88.5565	95.1742	(72)
Total internal gains	423.3479	433.1841	414.8987	400.0456	379.4139	365.5040	351.3988	352.1289	362.9804	375.5708	398.9084	414.3778	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	36.7938	0.7600	0.8000	0.7700	62.6316	(77)
Southwest	5.9000	36.7938	0.7600	0.8000	0.7700	91.4669	(79)
Northwest	0.4500	11.2829	0.7600	0.8000	0.7700	2.1393	(81)

Solar gains	156.2377	266.8413	366.9913	457.8837	515.7555	513.2960	494.3435	450.9744	398.4388	295.4253	187.2662	133.6232	(83)
Total gains	579.5856	700.0254	781.8900	857.9292	895.1694	878.8000	845.7423	803.1033	761.4192	670.9961	586.1746	548.0010	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	33.1049	33.3866	33.6714	35.0775	35.3537	36.6990	36.6990	36.9595	36.1689	35.3537	34.7994	34.2381	
alpha	3.2070	3.2258	3.2448	3.3385	3.3569	3.4466	3.4466	3.4640	3.4113	3.3569	3.3200	3.2825	
util living area	0.9899	0.9809	0.9656	0.9286	0.8568	0.7182	0.5694	0.6097	0.8080	0.9431	0.9822	0.9916	(86)
MIT	18.6287	18.9277	19.3509	19.9450	20.4294	20.8009	20.9344	20.9165	20.6711	20.0292	19.2710	18.6468	(87)
Th 2	19.2690	19.2805	19.2920	19.3469	19.3573	19.4061	19.4061	19.4153	19.3872	19.3573	19.3363	19.3145	(88)
util rest of house													

	0.9862	0.9739	0.9524	0.8992	0.7925	0.5916	0.3862	0.4298	0.7025	0.9134	0.9746	0.9885	(89)
MIT 2	16.6481	17.0330	17.5722	18.3364	18.9022	19.3025	19.3899	19.3915	19.1851	18.4602	17.5048	16.6972	(90)
Living area fraction										fLA = Living area / (4) =		0.3472	(91)
MIT	17.3358	17.6909	18.1898	18.8950	19.4325	19.8228	19.9262	19.9210	19.7011	19.0050	18.1181	17.3742	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.3358	17.6909	18.1898	18.8950	19.4325	19.8228	19.9262	19.9210	19.7011	19.0050	18.1181	17.3742	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9797	0.9644	0.9404	0.8888	0.7960	0.6289	0.4505	0.4924	0.7269	0.9047	0.9661	0.9830	(94)
Useful gains	567.8278	675.1199	735.2882	762.5005	712.5903	552.6608	381.0292	395.4869	553.4722	607.0489	566.3151	538.6810	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1725.4932	1678.7873	1521.2948	1248.5874	958.4102	623.6146	397.1524	417.4531	678.5874	1041.7605	1387.3994	1686.0900	(97)
Space heating kWh													
	861.3031	674.4645	584.7889	349.9826	182.8900	0.0000	0.0000	0.0000	0.0000	323.4254	591.1807	853.6723	(98a)
Space heating requirement - total per year (kWh/year)												4421.7073	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	861.3031	674.4645	584.7889	349.9826	182.8900	0.0000	0.0000	0.0000	0.0000	323.4254	591.1807	853.6723	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4421.7073	
Space heating per m2											(98c) / (4) =	70.0746	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	861.3031	674.4645	584.7889	349.9826	182.8900	0.0000	0.0000	0.0000	0.0000	323.4254	591.1807	853.6723	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	861.3031	674.4645	584.7889	349.9826	182.8900	0.0000	0.0000	0.0000	0.0000	323.4254	591.1807	853.6723	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.8777	14.3421	12.9135	9.4610	7.3079	5.9707	6.6665	8.6654	11.2555	14.7679	16.6803	18.3746	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4421.7073	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1816.7731	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	144.2832	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6382.7636	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4421.7073	0.1548	684.3711	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1816.7731	0.1412	256.4950	(264)
Space and water heating			940.8661	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	144.2832	0.1443	20.8245	(268)
Total CO2, kg/year			961.6907	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			15.2400	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4421.7073	1.5730	6955.3907	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1816.7731	1.5221	2765.2237	(278)
Space and water heating			9720.6145	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	144.2832	1.5338	221.3064	(282)
Total Primary energy kWh/year			9941.9208	(286)
Dwelling Primary energy Rate (DPER)			157.5600	(287)

Full SAP Calculation Printout

Property Reference	Apt. 5	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 5	**Prop Type Ref**	
Property			

SAP Rating	45 E	**DER**	15.24	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.9	**DFEE**	77.28	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	157.56	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		168.4770	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0245	1.0044	0.9844	0.8839	0.8638	0.7634	0.7634	0.7433	0.8036	0.8638	0.9040	0.9442	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	1.0245	1.0044	0.9845	0.8907	0.8731	0.7914	0.7914	0.7762	0.8229	0.8731	0.9086	0.9457	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
Corridor Wall	4.5700	2.1000	2.4700	0.1800	0.4446			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			133.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		48.7598			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	26.6440	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	75.4038	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	56.9615	55.8446	54.7345	49.5179	48.5419	43.9983	43.9983	43.1570	45.7484	48.5419	50.5163	52.5806	(38)

Heat transfer coeff

	132.3653	131.2485	130.1384	124.9217	123.9457	119.4022	119.4022	118.5608	121.1523	123.9457	125.9202	127.9844 (39)
Average = Sum(39)m / 12 =												124.9156

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0977	2.0800	2.0624	1.9797	1.9643	1.8923	1.8923	1.8789	1.9200	1.9643	1.9956	2.0283	(40)
HLP (average)												1.9796	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.0678 (42)

Hot water usage for mixer showers

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)

Hot water usage for baths

	25.4477	25.0698	24.5376	23.5563	22.8215	22.0067	21.5666	22.0951	22.6705	23.5424	24.5439	25.3617 (42b)

Hot water usage for other uses

	35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062 (42c)

Average daily hot water use (litres/day) 56.1452 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	61.2539	59.5740	57.7397	55.4564	53.4195	51.3027	50.8626	52.6932	54.5706	56.7445	59.0481	61.1679	(44)
Energy conte	97.0113	84.8325	88.7438	75.9170	71.9130	63.0827	61.5139	65.2451	67.2910	77.0018	84.1248	95.7742	(45)
Energy content (annual)										Total = Sum(45)m =		932.4510	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	82.4596	72.1076	75.4322	64.5294	61.1260	53.6203	52.2869	55.4584	57.1974	65.4515	71.5061	81.4080	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	82.4596	72.1076	75.4322	64.5294	61.1260	53.6203	52.2869	55.4584	57.1974	65.4515	71.5061	81.4080	(64)
									Total per year (kWh/year) = Sum(64)m =			792.5834	(64)
12Total per year (kWh/year)												793	(64)
Electric shower(s)													
	47.1608	42.0207	45.8849	43.7874	44.6091	42.5527	43.9712	44.6091	43.7874	45.8849	45.0221	47.1608	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						536.4512	(64a)
Heat gains from water heating, kWh/month													
	32.4051	28.5321	30.3293	27.0792	26.4338	24.0433	24.0645	25.0169	25.2462	27.8341	29.1320	32.1422	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	92.4673	102.3745	92.4673	95.5495	92.4673	95.5495	92.4673	92.4673	95.5495	92.4673	95.5495	92.4673	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	180.6921	182.5671	177.8421	167.7832	155.0856	143.1516	135.1790	133.3040	138.0290	148.0879	160.7855	172.7194	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)													
	43.5552	42.4584	40.7652	37.6100	35.5293	33.3934	32.3448	33.6248	35.0642	37.4114	40.4612	43.2019	(72)
Total internal gains													
	370.7314	381.4169	365.0914	354.9596	337.0990	326.1114	314.0079	313.4129	322.6595	331.9835	350.8130	362.4055	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	36.7938	0.7600	0.8000	0.7700	62.6316	(77)
Southwest	5.9000	36.7938	0.7600	0.8000	0.7700	91.4669	(79)
Northwest	0.4500	11.2829	0.7600	0.8000	0.7700	2.1393	(81)

Solar gains	156.2377	266.8413	366.9913	457.8837	515.7555	513.2960	494.3435	450.9744	398.4388	295.4253	187.2662	133.6232	(83)
Total gains	526.9692	648.2581	732.0827	812.8432	852.8545	839.4074	808.3514	764.3873	721.0983	627.4088	538.0792	496.0287	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	33.1049	33.3866	33.6714	35.0775	35.3537	36.6990	36.6990	36.9595	36.1689	35.3537	34.7994	34.2381	
alpha	3.2070	3.2258	3.2448	3.3385	3.3569	3.4466	3.4466	3.4640	3.4113	3.3569	3.3200	3.2825	
util living area													
	0.9923	0.9846	0.9711	0.9375	0.8705	0.7374	0.5895	0.6319	0.8267	0.9522	0.9861	0.9937	(86)
MIT	18.5551	18.8574	19.2868	19.8939	20.3931	20.7827	20.9269	20.9065	20.6427	19.9768	19.2045	18.5729	(87)
Th 2	19.2690	19.2805	19.2920	19.3469	19.3573	19.4061	19.4061	19.4153	19.3872	19.3573	19.3363	19.3145	(88)
util rest of house													
	0.9895	0.9789	0.9598	0.9109	0.8098	0.6122	0.4026	0.4492	0.7255	0.9262	0.9800	0.9914	(89)
MIT 2	17.1539	17.4604	17.8905	18.5137	18.9749	19.3163	19.3917	19.3940	19.2123	18.6112	17.8443	17.2017	(90)

Living area fraction										fLA = Living area / (4) =		0.3472	(91)
MIT	17.6404	17.9455	18.3754	18.9929	19.4673	19.8255	19.9248	19.9192	19.7090	19.0853	18.3166	17.6778	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.6404	17.9455	18.3754	18.9929	19.4673	19.8255	19.9248	19.9192	19.7090	19.0853	18.3166	17.6778	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9854	0.9725	0.9514	0.9036	0.8148	0.6496	0.4686	0.5132	0.7498	0.9204	0.9745	0.9880	(94)
Useful gains	519.2713	630.4062	696.4788	734.4729	694.8778	545.2960	378.7977	392.2966	540.7041	577.4576	524.3420	490.0911	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1765.8065	1712.2006	1545.4386	1260.8223	962.7290	623.9362	396.9862	417.2395	679.5430	1051.7209	1412.3971	1724.9519	(97)
Space heating kWh													
	927.4222	726.9658	631.6261	378.9715	199.2813	0.0000	0.0000	0.0000	0.0000	352.8519	639.3996	918.7364	(98a)
Space heating requirement - total per year (kWh/year)												4775.2548	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	927.4222	726.9658	631.6261	378.9715	199.2813	0.0000	0.0000	0.0000	0.0000	352.8519	639.3996	918.7364	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4775.2548	
Space heating per m2											(98c) / (4) =	75.6776	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	1122.3804	883.5761	901.0619	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7048	0.7870	0.7584	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	791.0716	695.3775	683.3975	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	945.9298	911.4810	861.8925	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	111.4979	160.7810	132.8003	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	27.8745	40.1953	33.2001	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												101.2698	(107)
Energy for space heating												75.6776	(99)
Energy for space cooling												1.6049	(108)
Total												77.2825	(109)
Fabric Energy Efficiency (DFEE)												77.3	(109)

Full SAP Calculation Printout

Property Reference	Apt. 5	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 5	**Prop Type Ref**	
Property			

SAP Rating	45 E	**DER**	15.24	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.9	**DFEE**	77.28	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	157.56	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		168.4770	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8687 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0245	1.0044	0.9844	0.8839	0.8638	0.7634	0.7634	0.7433	0.8036	0.8638	0.9040	0.9442	(22b)
Effective ac	1.0245	1.0044	0.9845	0.8907	0.8731	0.7914	0.7914	0.7762	0.8229	0.8731	0.9086	0.9457	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
Corridor Wall	4.5700	2.1000	2.4700	0.1800	0.4446			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			133.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		48.7598			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		26.6440 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	75.4038 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	56.9615	55.8446	54.7345	49.5179	48.5419	43.9983	43.9983	43.1570	45.7484	48.5419	50.5163	52.5806	(38)
Heat transfer coeff	132.3653	131.2485	130.1384	124.9217	123.9457	119.4022	119.4022	118.5608	121.1523	123.9457	125.9202	127.9844	(39)

Average = Sum(39)m / 12 = 124.9156

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0977	2.0800	2.0624	1.9797	1.9643	1.8923	1.8923	1.8789	1.9200	1.9643	1.9956	2.0283	(40)
HLP (average)												1.9796	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.0678 (42)

Hot water usage for mixer showers

66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)

Average daily hot water use (litres/day) 93.5492 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)										Total = Sum(45)m =		1553.9731	
Distribution loss (46)m = 0.15 x (45)m	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
										Total per year (kWh/year) = Sum(64)m =		1816.7731	(64)
12Total per year (kWh/year)												1817	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	71.5517	63.3197	67.3860	59.5411	57.9161	52.4059	51.8833	53.8216	54.2772	60.2631	63.7607	70.8096	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	92.4673	102.3745	92.4673	95.5495	92.4673	95.5495	92.4673	92.4673	95.5495	92.4673	95.5495	92.4673	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	180.6921	182.5671	177.8421	167.7832	155.0856	143.1516	135.1790	133.3040	138.0290	148.0879	160.7855	172.7194	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)	96.1717	94.2257	90.5725	82.6960	77.8442	72.7860	69.7357	72.3408	75.3851	80.9988	88.5565	95.1742	(72)
Total internal gains	423.3479	433.1841	414.8987	400.0456	379.4139	365.5040	351.3988	352.1289	362.9804	375.5708	398.9084	414.3778	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	36.7938	0.7600	0.8000	0.7700	62.6316	(77)
Southwest	5.9000	36.7938	0.7600	0.8000	0.7700	91.4669	(79)
Northwest	0.4500	11.2829	0.7600	0.8000	0.7700	2.1393	(81)

Solar gains	156.2377	266.8413	366.9913	457.8837	515.7555	513.2960	494.3435	450.9744	398.4388	295.4253	187.2662	133.6232	(83)
Total gains	579.5856	700.0254	781.8900	857.9292	895.1694	878.8000	845.7423	803.1033	761.4192	670.9961	586.1746	548.0010	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	33.1049	33.3866	33.6714	35.0775	35.3537	36.6990	36.6990	36.9595	36.1689	35.3537	34.7994	34.2381	
alpha	3.2070	3.2258	3.2448	3.3385	3.3569	3.4466	3.4466	3.4640	3.4113	3.3569	3.3200	3.2825	
util living area	0.9899	0.9809	0.9656	0.9286	0.8568	0.7182	0.5694	0.6097	0.8080	0.9431	0.9822	0.9916	(86)
MIT	18.6287	18.9277	19.3509	19.9450	20.4294	20.8009	20.9344	20.9165	20.6711	20.0292	19.2710	18.6468	(87)
Th 2	19.2690	19.2805	19.2920	19.3469	19.3573	19.4061	19.4061	19.4153	19.3872	19.3573	19.3363	19.3145	(88)
util rest of house													

	0.9862	0.9739	0.9524	0.8992	0.7925	0.5916	0.3862	0.4298	0.7025	0.9134	0.9746	0.9885	(89)
MIT 2	16.6481	17.0330	17.5722	18.3364	18.9022	19.3025	19.3899	19.3915	19.1851	18.4602	17.5048	16.6972	(90)
Living area fraction										fLA = Living area / (4) =		0.3472	(91)
MIT	17.3358	17.6909	18.1898	18.8950	19.4325	19.8228	19.9262	19.9210	19.7011	19.0050	18.1181	17.3742	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.3358	17.6909	18.1898	18.8950	19.4325	19.8228	19.9262	19.9210	19.7011	19.0050	18.1181	17.3742	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9797	0.9644	0.9404	0.8888	0.7960	0.6289	0.4505	0.4924	0.7269	0.9047	0.9661	0.9830	(94)
Useful gains	567.8278	675.1199	735.2882	762.5005	712.5903	552.6608	381.0292	395.4869	553.4722	607.0489	566.3151	538.6810	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1725.4932	1678.7873	1521.2948	1248.5874	958.4102	623.6146	397.1524	417.4531	678.5874	1041.7605	1387.3994	1686.0900	(97)
Space heating kWh													
	861.3031	674.4645	584.7889	349.9826	182.8900	0.0000	0.0000	0.0000	0.0000	323.4254	591.1807	853.6723	(98a)
Space heating requirement - total per year (kWh/year)												4421.7073	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	861.3031	674.4645	584.7889	349.9826	182.8900	0.0000	0.0000	0.0000	0.0000	323.4254	591.1807	853.6723	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4421.7073	
Space heating per m2											(98c) / (4) =	70.0746	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	861.3031	674.4645	584.7889	349.9826	182.8900	0.0000	0.0000	0.0000	0.0000	323.4254	591.1807	853.6723	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	861.3031	674.4645	584.7889	349.9826	182.8900	0.0000	0.0000	0.0000	0.0000	323.4254	591.1807	853.6723	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.8777	14.3421	12.9135	9.4610	7.3079	5.9707	6.6665	8.6654	11.2555	14.7679	16.6803	18.3746	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4421.7073	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1816.7731	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	144.2832	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6382.7636	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4421.7073	0.1548	684.3711	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1816.7731	0.1412	256.4950	(264)
Space and water heating			940.8661	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	144.2832	0.1443	20.8245	(268)
Total CO2, kg/year			961.6907	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			15.2400	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4421.7073	1.5730	6955.3907	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1816.7731	1.5221	2765.2237	(278)
Space and water heating			9720.6145	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	144.2832	1.5338	221.3064	(282)
Total Primary energy kWh/year			9941.9208	(286)
Dwelling Primary energy Rate (DPER)			157.5600	(287)

Full SAP Calculation Printout

Property Reference	Apt. 5	Issued on Date	01/10/2024
Assessment Reference	Apt. 5	Prop Type Ref	
Property			

SAP Rating	45 E	DER	15.24	TER	
Environmental	88 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.9	DFEE	77.28	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	157.56	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		168.4770	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0245	1.0044	0.9844	0.8839	0.8638	0.7634	0.7634	0.7433	0.8036	0.8638	0.9040	0.9442	(22b)
Effective ac	1.0245	1.0044	0.9845	0.8907	0.8731	0.7914	0.7914	0.7762	0.8229	0.8731	0.9086	0.9457	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
Corridor Wall	4.5700	2.1000	2.4700	0.1800	0.4446			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			133.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		48.7598			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		26.6440	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	75.4038	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	56.9615	55.8446	54.7345	49.5179	48.5419	43.9983	43.9983	43.1570	45.7484	48.5419	50.5163	52.5806	(38)
Heat transfer coeff	132.3653	131.2485	130.1384	124.9217	123.9457	119.4022	119.4022	118.5608	121.1523	123.9457	125.9202	127.9844	(39)

Average = Sum(39)m / 12 = 124.9156

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0977	2.0800	2.0624	1.9797	1.9643	1.8923	1.8923	1.8789	1.9200	1.9643	1.9956	2.0283	(40)
HLP (average)												1.9796	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.0678 (42)

Hot water usage for mixer showers

66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)

Average daily hot water use (litres/day) 93.5492 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)										Total = Sum(45)m =		1553.9731	
Distribution loss (46)m = 0.15 x (45)m	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)

Water storage loss:

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.7200 (55)

Total storage loss

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
									Total per year (kWh/year) = Sum(64)m =		1816.7731	(64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)

Heat gains from water heating, kWh/month

71.5517	63.3197	67.3860	59.5411	57.9161	52.4059	51.8833	53.8216	54.2772	60.2631	63.7607	70.8096	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

20.4248	18.1411	14.7533	11.1692	8.3491	7.0487	7.6164	9.9000	13.2878	16.8719	19.6920	20.9924	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

269.6896	272.4882	265.4360	250.4226	231.4710	213.6591	201.7597	198.9612	206.0134	221.0267	239.9784	257.7902	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	(69)
Pumps, fans 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)

Water heating gains (Table 5)

96.1717	94.2257	90.5725	82.6960	77.8442	72.7860	69.7357	72.3408	75.3851	80.9988	88.5565	95.1742	(72)

Total internal gains

477.1165	475.6853	461.5922	435.1182	408.4946	384.3242	369.9421	372.0323	385.5166	409.7277	439.0572	464.7872	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	36.7938	0.7600	0.8000	0.7700	62.6316	(77)
Southwest	5.9000	36.7938	0.7600	0.8000	0.7700	91.4669	(79)
Northwest	0.4500	11.2829	0.7600	0.8000	0.7700	2.1393	(81)

Solar gains	156.2377	266.8413	366.9913	457.8837	515.7555	513.2960	494.3435	450.9744	398.4388	295.4253	187.2662	133.6232	(83)
Total gains	633.3542	742.5266	828.5834	893.0019	924.2501	897.6202	864.2856	823.0067	783.9554	705.1531	626.3234	598.4104	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	33.1049	33.3866	33.6714	35.0775	35.3537	36.6990	36.6990	36.9595	36.1689	35.3537	34.7994	34.2381	
alpha	3.2070	3.2258	3.2448	3.3385	3.3569	3.4466	3.4466	3.4640	3.4113	3.3569	3.3200	3.2825	
util living area	0.9870	0.9775	0.9600	0.9214	0.8472	0.7091	0.5597	0.5987	0.7975	0.9356	0.9786	0.9891	(86)
MIT	18.7031	18.9846	19.4098	19.9835	20.4531	20.8090	20.9378	20.9211	20.6860	20.0690	19.3256	18.7179	(87)
Th 2	19.2690	19.2805	19.2920	19.3469	19.3573	19.4061	19.4061	19.4153	19.3872	19.3573	19.3363	19.3145	(88)
util rest of house	0.9823	0.9695	0.9449	0.8898	0.7806	0.5822	0.3785	0.4204	0.6899	0.9028	0.9695	0.9852	(89)

MIT 2	16.7421	17.1040	17.6438	18.3802	18.9251	19.3076	19.3909	19.3931	19.1965	18.5052	17.5727	16.7872	(90)
Living area fraction										fLA = Living area / (4) =		0.3472	(91)
MIT	17.4230	17.7570	18.2570	18.9369	19.4557	19.8289	19.9280	19.9236	19.7137	19.0482	18.1814	17.4575	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4230	17.7570	18.2570	18.9369	19.4557	19.8289	19.9280	19.9236	19.7137	19.0482	18.1814	17.4575	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9746	0.9591	0.9323	0.8797	0.7854	0.6199	0.4421	0.4825	0.7156	0.8946	0.9602	0.9786	(94)
Useful gains	617.2932	712.1485	772.5123	785.5958	725.8832	556.4406	382.1416	397.1218	560.9775	630.8021	601.3809	585.6046	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1737.0368	1687.4639	1530.0347	1253.8279	961.2849	624.3445	397.3684	417.7654	680.1137	1047.1191	1395.3709	1696.7594	(97)
Space heating kWh	833.0892	655.4120	563.5967	337.1271	175.1389	0.0000	0.0000	0.0000	0.0000	309.7398	571.6728	826.6992	(98a)
Space heating requirement - total per year (kWh/year)												4272.4756	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	833.0892	655.4120	563.5967	337.1271	175.1389	0.0000	0.0000	0.0000	0.0000	309.7398	571.6728	826.6992	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4272.4756	
Space heating per m2											(98c) / (4) =	67.7096	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	833.0892	655.4120	563.5967	337.1271	175.1389	0.0000	0.0000	0.0000	0.0000	309.7398	571.6728	826.6992	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	833.0892	655.4120	563.5967	337.1271	175.1389	0.0000	0.0000	0.0000	0.0000	309.7398	571.6728	826.6992	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.8777	14.3421	12.9135	9.4610	7.3079	5.9707	6.6665	8.6654	11.2555	14.7679	16.6803	18.3746	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4272.4756	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1816.7731	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	144.2832	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6233.5319	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4272.4756	16.4900	704.5312	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	1816.7731	16.4900	299.5859	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	144.2832	16.4900	23.7923	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1027.9094	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.4232	(257)
SAP value		44.5100	
SAP rating (Section 12)		45	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4272.4756	0.1548	661.4164	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1816.7731	0.1412	256.4950	(264)
Space and water heating			917.9114	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	144.2832	0.1443	20.8245	(268)
Total CO2, kg/year			938.7360	(272)
CO2 emissions per m2			14.8800	(273)
EI value			88.3635	
EI rating			88	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		168.4770	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9643	0.9442	0.9241	0.8437	0.8236	0.7433	0.7433	0.7433	0.7433	0.8437	0.8638	0.9040	(22b)
Effective ac	0.9649	0.9457	0.9270	0.8559	0.8392	0.7762	0.7762	0.7762	0.7762	0.8559	0.8731	0.9086	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
Corridor Wall	4.5700	2.1000	2.4700	0.1800	0.4446			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)

Total net area of external elements Aum(A, m2) 133.2200 (31)
Fabric heat loss, W/K = Sum (A x U) (26)...(30) + (32) = 48.7598 (33)
Party Ceiling 1 57.9400 (32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area) 26.6440 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 75.4038 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	53.6463	52.5806	51.5372	47.5883	46.6572	43.1570	43.1570	43.1570	43.1570	47.5883	48.5419	50.5163	(38)
Heat transfer coeff	129.0502	127.9844	126.9411	122.9921	122.0610	118.5608	118.5608	118.5608	118.5608	122.9921	123.9457	125.9202	(39)
Average = Sum(39)m / 12 =												123.0108	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0452	2.0283	2.0117	1.9492	1.9344	1.8789	1.8789	1.8789	1.8789	1.9492	1.9643	1.9956	(40)
HLP (average)												1.9495	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.0678 (42)
Hot water usage for mixer showers

66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)

Average daily hot water use (litres/day) 93.5492 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)											Total = Sum(45)m =	1553.9731	
Distribution loss (46)m = 0.15 x (45)m	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)

Water storage loss:
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)
Temperature factor from Table 2b 0.6000 (49)
Enter (49) or (54) in (55) 0.7200 (55)
Total storage loss

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
									Total per year (kWh/year) = Sum(64)m =		1816.7731	(64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

71.5517	63.3197	67.3860	59.5411	57.9161	52.4059	51.8833	53.8216	54.2772	60.2631	63.7607	70.8096	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.4248	18.1411	14.7533	11.1692	8.3491	7.0487	7.6164	9.9000	13.2878	16.8719	19.6920	20.9924	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	269.6896	272.4882	265.4360	250.4226	231.4710	213.6591	201.7597	198.9612	206.0134	221.0267	239.9784	257.7902	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	(69)
Pumps, fans 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)	
Losses e.g. evaporation (negative values) (Table 5)	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)	96.1717	94.2257	90.5725	82.6960	77.8442	72.7860	69.7357	72.3408	75.3851	80.9988	88.5565	95.1742	(72)
Total internal gains	477.1165	475.6853	461.5922	435.1182	408.4946	384.3242	369.9421	372.0323	385.5166	409.7277	439.0572	464.7872	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	33.9635	0.7600	0.8000	0.7700	57.8137	(77)
Southwest	5.9000	33.9635	0.7600	0.8000	0.7700	84.4310	(79)
Northwest	0.4500	10.4150	0.7600	0.8000	0.7700	1.9747	(81)

Solar gains	144.2194	252.0167	363.1685	463.9888	513.0693	520.9954	486.4968	436.6121	398.4388	290.9492	175.9167	127.2602	(83)
Total gains	621.3359	727.7021	824.7606	899.1070	921.5639	905.3196	856.4389	808.6444	783.9554	700.6769	614.9740	592.0474	(84)

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7. Mean internal temperature (heating season)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	33.9554	34.2381	34.5195	35.6278	35.8996	36.9595	36.9595	36.9595	36.9595	35.6278	35.3537	34.7994	
alpha	3.2637	3.2825	3.3013	3.3752	3.3933	3.4640	3.4640	3.4640	3.4640	3.3752	3.3569	3.3200	
util living area	0.9868	0.9774	0.9582	0.9155	0.8350	0.6964	0.5809	0.6163	0.7922	0.9345	0.9777	0.9887	(86)
MIT	18.8230	19.0801	19.4950	20.0502	20.5108	20.8253	20.9282	20.9117	20.7045	20.0924	19.4141	18.8216	(87)
Th 2	19.3034	19.3145	19.3255	19.3674	19.3774	19.4153	19.4153	19.4153	19.4153	19.3674	19.3573	19.3363	(88)
util rest of house	0.9819	0.9692	0.9426	0.8817	0.7634	0.5672	0.4054	0.4398	0.6850	0.9011	0.9681	0.9845	(89)
MIT 2	16.9146	17.2451	17.7705	18.4730	19.0017	19.3276	19.3954	19.3889	19.2359	18.5403	17.6975	16.9322	(90)
Living area fraction										fLA = Living area / (4) =		0.3472	(91)
MIT	17.5772	17.8823	18.3693	19.0206	19.5257	19.8476	19.9276	19.9177	19.7459	19.0792	18.2935	17.5882	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5772	17.8823	18.3693	19.0206	19.5257	19.8476	19.9276	19.9177	19.7459	19.0792	18.2935	17.5882	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9744	0.9590	0.9303	0.8726	0.7711	0.6064	0.4666	0.5010	0.7112	0.8932	0.9588	0.9779	(94)
Useful gains	605.4085	697.9024	767.2373	784.5848	710.6475	549.0242	399.6089	405.1138	557.5413	625.8536	589.6597	578.9394	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1661.8107	1623.1321	1481.3099	1220.1593	918.5920	610.3074	418.2408	428.9122	669.3803	1030.5810	1337.8100	1635.4805	(97)
Space heating kWh	785.9633	621.7543	531.2700	313.6136	154.7107	0.0000	0.0000	0.0000	0.0000	301.1172	538.6682	786.0666	(98a)
Space heating requirement - total per year (kWh/year)												4033.1639	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	785.9633	621.7543	531.2700	313.6136	154.7107	0.0000	0.0000	0.0000	0.0000	301.1172	538.6682	786.0666	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4033.1639	
Space heating per m2											(98c) / (4) =	63.9170	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	785.9633	621.7543	531.2700	313.6136	154.7107	0.0000	0.0000	0.0000	0.0000	301.1172	538.6682	786.0666	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	785.9633	621.7543	531.2700	313.6136	154.7107	0.0000	0.0000	0.0000	0.0000	301.1172	538.6682	786.0666	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.8777	14.3421	12.9135	9.4610	7.3079	5.9707	6.6665	8.6654	11.2555	14.7679	16.6803	18.3746	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4033.1639	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1816.7731	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	144.2832	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)

Appendix Q - special features

Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5994.2202	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4033.1639	26.0600	1051.0425	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1816.7731	26.0600	473.4511	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	144.2832	26.0600	37.6002	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1562.0938	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4033.1639	0.1549	624.5653	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1816.7731	0.1412	256.4950	(264)
Space and water heating			881.0603	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	144.2832	0.1443	20.8245	(268)
Total CO2, kg/year			901.8848	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4033.1639	1.5733	6345.4589	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1816.7731	1.5221	2765.2237	(278)
Space and water heating			9110.6827	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	144.2832	1.5338	221.3064	(282)
Total Primary energy kWh/year			9331.9890	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 5

Current energy efficiency rating: E 45
Current environmental impact rating: B 88

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings		Energy efficiency	Environmental impact
Recommended measures				
(none)				
Total Savings	£0	0.00 kg/m²		

Potential energy efficiency rating: E 45
Potential environmental impact rating: B 88

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£1562	£1562	£0
Space heating	£1051	£1051	£0
Water heating	£473	£473	£0
Lighting	£38	£38	£0
Total cost of fuels	£1562	£1562	£0
Total cost of uses	£1562	£1562	£0
Delivered energy	95 kWh/m²	95 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.9 tonnes	0.9 tonnes	0.0 tonnes
CO2 emissions per m²	14 kg/m²	14 kg/m²	0 kg/m²
Primary energy	148 kWh/m²	148 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000 (1b)	x	2.6700 (2b)	=	168.4770 (1b) - (3b)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	168.4770	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0245	1.0044	0.9844	0.8839	0.8638	0.7634	0.7634	0.7433	0.8036	0.8638	0.9040	0.9442	(22b)
Effective ac	1.0245	1.0044	0.9845	0.8907	0.8731	0.7914	0.7914	0.7762	0.8229	0.8731	0.9086	0.9457	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
Corridor Wall	4.5700	2.1000	2.4700	0.1800	0.4446			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			133.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		48.7598			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	26.6440	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	75.4038	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	56.9615	55.8446	54.7345	49.5179	48.5419	43.9983	43.9983	43.1570	45.7484	48.5419	50.5163	52.5806	(38)
Heat transfer coeff	132.3653	131.2485	130.1384	124.9217	123.9457	119.4022	119.4022	118.5608	121.1523	123.9457	125.9202	127.9844	(39)
Average = Sum(39)m / 12 =												124.9156	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0977	2.0800	2.0624	1.9797	1.9643	1.8923	1.8923	1.8789	1.9200	1.9643	1.9956	2.0283	(40)
HLP (average)												1.9796	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.0678	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)

Average daily hot water use (litres/day)	93.5492 (43)

Daily hot water use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte 161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)

Energy content (annual)	Total = Sum(45)m =	1553.9731

Distribution loss (46)m = 0.15 x (45)m

24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)

Water storage loss:	
Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2000 (48)
Temperature factor from Table 2b	0.6000 (49)
Enter (49) or (54) in (55)	0.7200 (55)

Total storage loss

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)

Total per year (kWh/year) = Sum(64)m = 1816.7731 (64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

71.5517	63.3197	67.3860	59.5411	57.9161	52.4059	51.8833	53.8216	54.2772	60.2631	63.7607	70.8096	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

20.4248	18.1411	14.7533	11.1692	8.3491	7.0487	7.6164	9.9000	13.2878	16.8719	19.6920	20.9924	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

269.6896	272.4882	265.4360	250.4226	231.4710	213.6591	201.7597	198.9612	206.0134	221.0267	239.9784	257.7902	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	(69)
Pumps, fans 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)

Water heating gains (Table 5)

96.1717	94.2257	90.5725	82.6960	77.8442	72.7860	69.7357	72.3408	75.3851	80.9988	88.5565	95.1742	(72)

Total internal gains

477.1165	475.6853	461.5922	435.1182	408.4946	384.3242	369.9421	372.0323	385.5166	409.7277	439.0572	464.7872	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	36.7938	0.7600	0.8000	0.7700	62.6316	(77)
Southwest	5.9000	36.7938	0.7600	0.8000	0.7700	91.4669	(79)
Northwest	0.4500	11.2829	0.7600	0.8000	0.7700	2.1393	(81)

Solar gains 156.2377	266.8413	366.9913	457.8837	515.7555	513.2960	494.3435	450.9744	398.4388	295.4253	187.2662	133.6232	(83)
Total gains 633.3542	742.5266	828.5834	893.0019	924.2501	897.6202	864.2856	823.0067	783.9554	705.1531	626.3234	598.4104	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	33.1049	33.3866	33.6714	35.0775	35.3537	36.6990	36.6990	36.9595	36.1689	35.3537	34.7994	34.2381	
alpha	3.2070	3.2258	3.2448	3.3385	3.3569	3.4466	3.4466	3.4640	3.4113	3.3569	3.3200	3.2825	
util living area													
	0.9870	0.9775	0.9600	0.9214	0.8472	0.7091	0.5597	0.5987	0.7975	0.9356	0.9786	0.9891	(86)
MIT	18.7031	18.9846	19.4098	19.9835	20.4531	20.8090	20.9378	20.9211	20.6860	20.0690	19.3256	18.7179	(87)
Th 2	19.2690	19.2805	19.2920	19.3469	19.3573	19.4061	19.4061	19.4153	19.3872	19.3573	19.3363	19.3145	(88)
util rest of house													
	0.9823	0.9695	0.9449	0.8898	0.7806	0.5822	0.3785	0.4204	0.6899	0.9028	0.9695	0.9852	(89)
MIT 2	16.7421	17.1040	17.6438	18.3802	18.9251	19.3076	19.3909	19.3931	19.1965	18.5052	17.5727	16.7872	(90)
Living area fraction									fLA = Living area / (4) =			0.3472	(91)
MIT	17.4230	17.7570	18.2570	18.9369	19.4557	19.8289	19.9280	19.9236	19.7137	19.0482	18.1814	17.4575	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4230	17.7570	18.2570	18.9369	19.4557	19.8289	19.9280	19.9236	19.7137	19.0482	18.1814	17.4575	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9746	0.9591	0.9323	0.8797	0.7854	0.6199	0.4421	0.4825	0.7156	0.8946	0.9602	0.9786	(94)
Useful gains	617.2932	712.1485	772.5123	785.5958	725.8832	556.4406	382.1416	397.1218	560.9775	630.8021	601.3809	585.6046	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1737.0368	1687.4639	1530.0347	1253.8279	961.2849	624.3445	397.3684	417.7654	680.1137	1047.1191	1395.3709	1696.7594	(97)
Space heating kWh													
	833.0892	655.4120	563.5967	337.1271	175.1389	0.0000	0.0000	0.0000	0.0000	309.7398	571.6728	826.6992	(98a)
Space heating requirement - total per year (kWh/year)												4272.4756	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	833.0892	655.4120	563.5967	337.1271	175.1389	0.0000	0.0000	0.0000	0.0000	309.7398	571.6728	826.6992	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4272.4756	
Space heating per m2											(98c) / (4) =	67.7096	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	833.0892	655.4120	563.5967	337.1271	175.1389	0.0000	0.0000	0.0000	0.0000	309.7398	571.6728	826.6992	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	833.0892	655.4120	563.5967	337.1271	175.1389	0.0000	0.0000	0.0000	0.0000	309.7398	571.6728	826.6992	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.8777	14.3421	12.9135	9.4610	7.3079	5.9707	6.6665	8.6654	11.2555	14.7679	16.6803	18.3746	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4272.4756	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1816.7731	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												144.2832	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												6233.5319	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4272.4756	16.4900	704.5312	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1816.7731	16.4900	299.5859	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	144.2832	16.4900	23.7923	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1027.9094	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.4232	(257)
SAP value		44.5100	
SAP rating (Section 12)		45	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4272.4756	0.1548	661.4164	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1816.7731	0.1412	256.4950	(264)
Space and water heating			917.9114	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	144.2832	0.1443	20.8245	(268)
Total CO2, kg/year			938.7360	(272)
CO2 emissions per m2			14.8800	(273)

EI value	88.3635	
EI rating	88	(274)
EI band	B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		168.4770	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8687 (18)
Number of sides sheltered		1 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9643	0.9442	0.9241	0.8437	0.8236	0.7433	0.7433	0.7433	0.7433	0.8437	0.8638	0.9040	(22b)
Effective ac	0.9649	0.9457	0.9270	0.8559	0.8392	0.7762	0.7762	0.7762	0.7762	0.8559	0.8731	0.9086	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
New Door			2.1000	1.4000	2.9400			(26)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
Corridor Wall	4.5700	2.1000	2.4700	0.1800	0.4446			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			133.2200					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	48.7598			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	26.6440	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	75.4038	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	53.6463	52.5806	51.5372	47.5883	46.6572	43.1570	43.1570	43.1570	43.1570	47.5883	48.5419	50.5163	(38)
Heat transfer coeff	129.0502	127.9844	126.9411	122.9921	122.0610	118.5608	118.5608	118.5608	118.5608	122.9921	123.9457	125.9202	(39)
Average = Sum(39)m / 12 =												123.0108	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0452	2.0283	2.0117	1.9492	1.9344	1.8789	1.8789	1.8789	1.8789	1.9492	1.9643	1.9956	(40)
HLP (average)												1.9495	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.0678	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)

Average daily hot water use (litres/day) 93.5492 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)										Total = Sum(45)m =		1553.9731	
Distribution loss (46)m = 0.15 x (45)m	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
										Total per year (kWh/year) = Sum(64)m =		1816.7731	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	71.5517	63.3197	67.3860	59.5411	57.9161	52.4059	51.8833	53.8216	54.2772	60.2631	63.7607	70.8096	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.4248	18.1411	14.7533	11.1692	8.3491	7.0487	7.6164	9.9000	13.2878	16.8719	19.6920	20.9924	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	269.6896	272.4882	265.4360	250.4226	231.4710	213.6591	201.7597	198.9612	206.0134	221.0267	239.9784	257.7902	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)	96.1717	94.2257	90.5725	82.6960	77.8442	72.7860	69.7357	72.3408	75.3851	80.9988	88.5565	95.1742	(72)
Total internal gains	477.1165	475.6853	461.5922	435.1182	408.4946	384.3242	369.9421	372.0323	385.5166	409.7277	439.0572	464.7872	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	33.9635	0.7600	0.8000	0.7700	57.8137	(77)
Southwest	5.9000	33.9635	0.7600	0.8000	0.7700	84.4310	(79)
Northwest	0.4500	10.4150	0.7600	0.8000	0.7700	1.9747	(81)

Solar gains	144.2194	252.0167	363.1685	463.9888	513.0693	520.9954	486.4968	436.6121	398.4388	290.9492	175.9167	127.2602	(83)
Total gains	621.3359	727.7021	824.7606	899.1070	921.5639	905.3196	856.4389	808.6444	783.9554	700.6769	614.9740	592.0474	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	33.9554	34.2381	34.5195	35.6278	35.8996	36.9595	36.9595	36.9595	36.9595	35.6278	35.3537	34.7994	
alpha	3.2637	3.2825	3.3013	3.3752	3.3933	3.4640	3.4640	3.4640	3.4640	3.3752	3.3569	3.3200	
util living area	0.9868	0.9774	0.9582	0.9155	0.8350	0.6964	0.5809	0.6163	0.7922	0.9345	0.9777	0.9887	(86)
MIT	18.8230	19.0801	19.4950	20.0502	20.5108	20.8253	20.9282	20.9117	20.7045	20.0924	19.4141	18.8216	(87)
Th 2	19.3034	19.3145	19.3255	19.3674	19.3774	19.4153	19.4153	19.4153	19.4153	19.3674	19.3573	19.3363	(88)
util rest of house	0.9819	0.9692	0.9426	0.8817	0.7634	0.5672	0.4054	0.4398	0.6850	0.9011	0.9681	0.9845	(89)
MIT 2	16.9146	17.2451	17.7705	18.4730	19.0017	19.3276	19.3954	19.3889	19.2359	18.5403	17.6975	16.9322	(90)
Living area fraction										fLA = Living area / (4) =		0.3472	(91)
MIT	17.5772	17.8823	18.3693	19.0206	19.5257	19.8476	19.9276	19.9177	19.7459	19.0792	18.2935	17.5882	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5772	17.8823	18.3693	19.0206	19.5257	19.8476	19.9276	19.9177	19.7459	19.0792	18.2935	17.5882	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9744	0.9590	0.9303	0.8726	0.7711	0.6064	0.4666	0.5010	0.7112	0.8932	0.9588	0.9779	(94)
Useful gains	605.4085	697.9024	767.2373	784.5848	710.6475	549.0242	399.6089	405.1138	557.5413	625.8536	589.6597	578.9394	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1661.8107	1623.1321	1481.3099	1220.1593	918.5920	610.3074	418.2408	428.9122	669.3803	1030.5810	1337.8100	1635.4805	(97)
Space heating kWh	785.9633	621.7543	531.2700	313.6136	154.7107	0.0000	0.0000	0.0000	0.0000	301.1172	538.6682	786.0666	(98a)

Space heating requirement - total per year (kWh/year) 4033.1639

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

785.9633	621.7543	531.2700	313.6136	154.7107	0.0000	0.0000	0.0000	0.0000	301.1172	538.6682	786.0666	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 4033.1639

Space heating per m2 (98c) / (4) = 63.9170 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	785.9633	621.7543	531.2700	313.6136	154.7107	0.0000	0.0000	0.0000	0.0000	301.1172	538.6682	786.0666	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	785.9633	621.7543	531.2700	313.6136	154.7107	0.0000	0.0000	0.0000	0.0000	301.1172	538.6682	786.0666	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	183.8110	162.0899	171.2823	148.7012	142.8014	127.2419	124.6579	130.4871	132.8699	149.8601	161.3916	181.5789	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.8777	14.3421	12.9135	9.4610	7.3079	5.9707	6.6665	8.6654	11.2555	14.7679	16.6803	18.3746	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 4033.1639 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 1816.7731 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 144.2832 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N) 0.0000 (235a)

Electricity generated - Micro CHP (Appendix N) 0.0000 (235)

Appendix Q - special features

Energy saved or generated -0.0000 (236)

Energy used 0.0000 (237)

Total delivered energy for all uses 5994.2202 (238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4033.1639	26.0600	1051.0425	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1816.7731	26.0600	473.4511	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	144.2832	26.0600	37.6002	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1562.0938	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4033.1639	0.1549	624.5653	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1816.7731	0.1412	256.4950	(264)
Space and water heating			881.0603	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	144.2832	0.1443	20.8245	(268)
Total CO2, kg/year			901.8848	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4033.1639	1.5733	6345.4589	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1816.7731	1.5221	2765.2237	(278)
Space and water heating			9110.6827	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	144.2832	1.5338	221.3064	(282)
Total Primary energy kWh/year			9331.9890	(286)

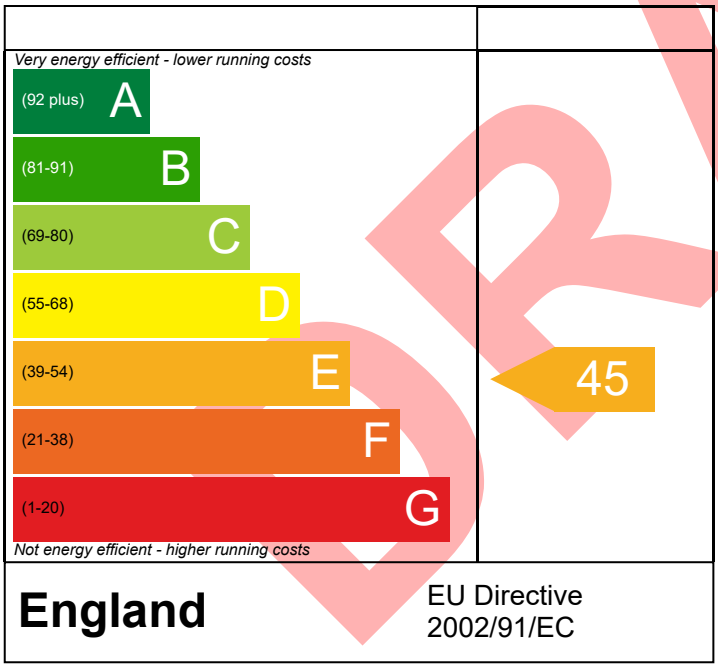
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	63.1 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

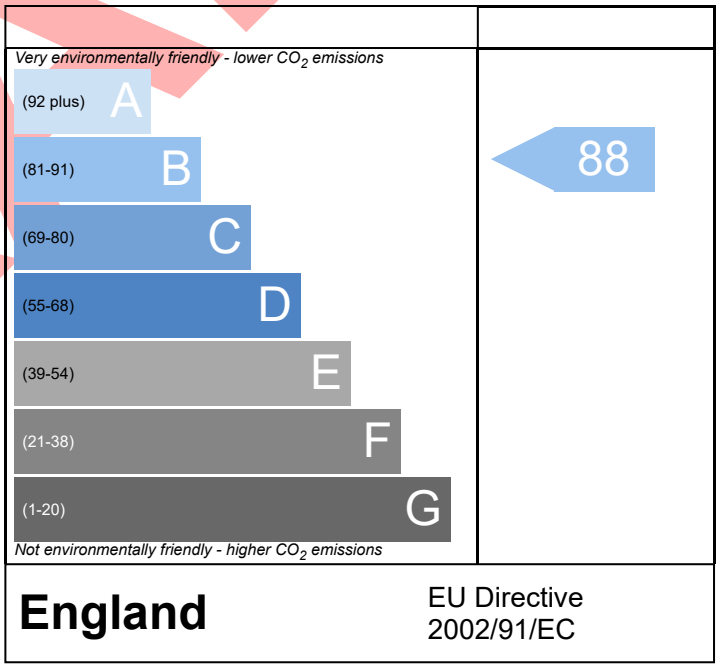
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

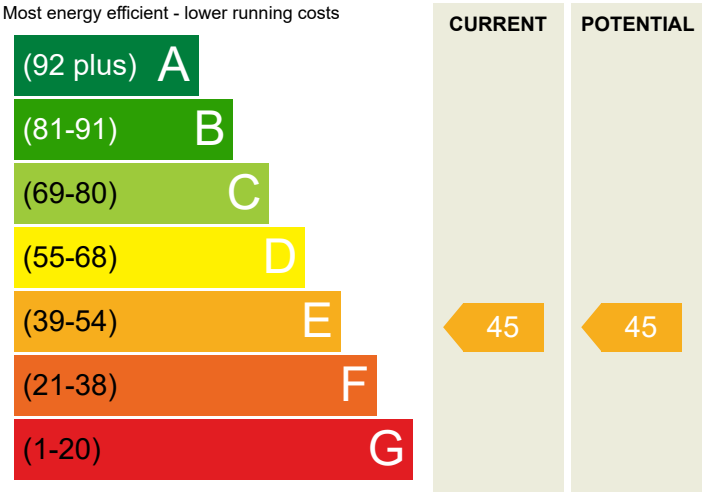
Energy Report

Dwelling Address	
Reference	Apt. 5-Apt. 5
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	63

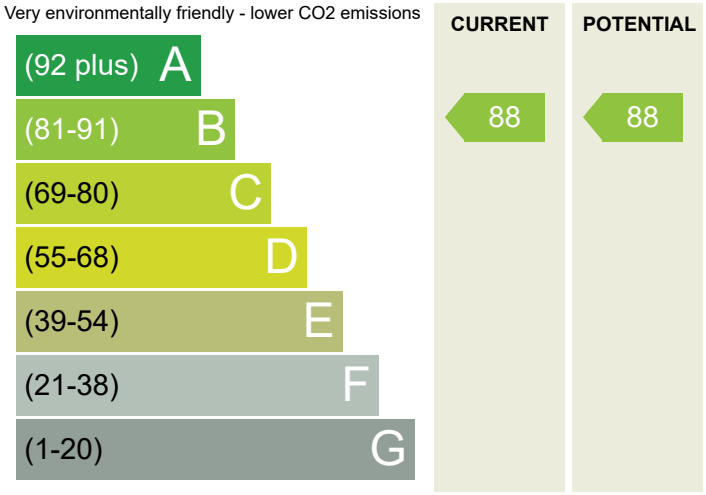
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

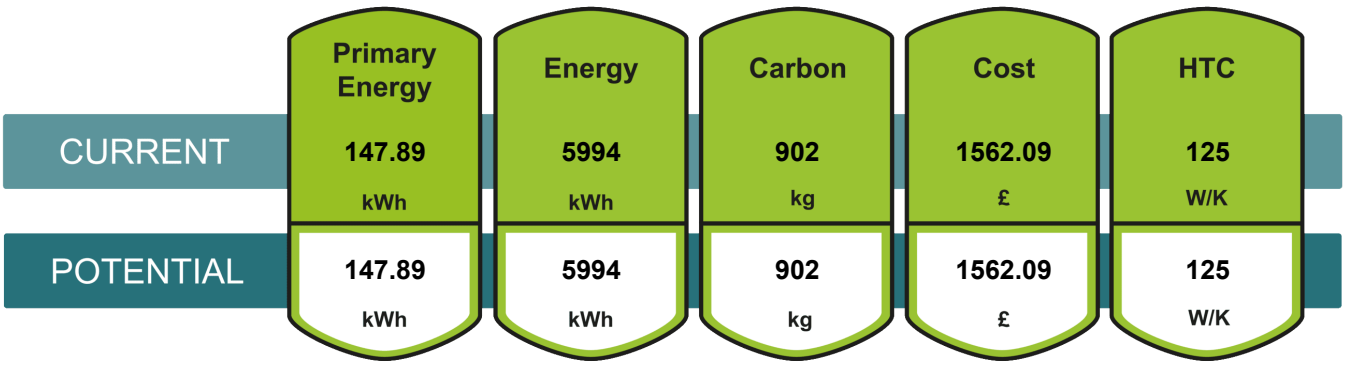
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.29 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£38	£38	
Heating	£1051	£1051	
Hot Water	£473	£473	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1562	£1562	

Estimated energy use and potential savings

Space Heating
4033
kWh per year

Water Heating
1817
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 5	Issued on Date	01/10/2024
Assessment Reference	Apt. 5	Prop Type Ref	Detached Flat
Property			

SAP Rating	45 E	DER	15.24	TER	
Environmental	88 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.90	DFEE	77.28	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	157.56	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northeast (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	60.39	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	4.57	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	5.16	m²	

Comments

Heat Loss Floors

Description	Heatloss Floor 1		
Type	Ground Floor - Solid		
Construction	Other		
U-value	0.25	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	63.10	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SE1	New Glazing	External Wall 1	South East	4.04
D NW	New Door	Corridor Wall	North West	2.10
W SW1	New Glazing	External Wall 1	South West	5.90
W NW1	New Glazing	External Wall 1	North West	0.45

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System No

Comments

Lighting

No Fixed Lighting No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	100.00	10.00	1000.00	10

Comments

Main Heating 1	SAP table	
Fuel Type	Electricity	
Winter Efficiency		%
Summer Efficiency		%
Model Name		
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue	No	
Heat Emitter		
Flow Temperature		
Flow Temperature Value		

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	Hot Water Cylinder
Independent Time Control	No
Cylinder Stat	No
Insulation Type	Measured Loss

Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day
Pipes insulation		

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 6	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 6	**Prop Type Ref**	
Property			

SAP Rating	43 E	**DER**	16.57	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.86	**DFEE**	83.78	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	171.49	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.75 m	55.17 m²	3.01 m

8.0 Living Area	22.06	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	44.58	36.86	0.00	None	7.72	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	20.89	18.79	0.00	None	2.10	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	55.17	55.17	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	55.17

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NE1	New Glazing	External Wall 1	North East	5.36	0
D SW	New Door	Corridor Wall	South West	2.10	0
W NW1	New Glazing	External Wall 1	North West	2.36	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	100.00	10.00	1000.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None	
28.0 Water Heating		

Summary for Input Data

Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 6	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 6	**Prop Type Ref**	
Property			

SAP Rating	43 E	**DER**	16.57	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.86	**DFEE**	83.78	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	171.49	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8704 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9433	0.9248	0.9063	0.8139	0.7954	0.7029	0.7029	0.6844	0.7399	0.7954	0.8324	0.8693	(22b)
Effective ac	0.9449	0.9277	0.9107	0.8312	0.8163	0.7470	0.7470	0.7342	0.7737	0.8163	0.8464	0.8779	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			120.6400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4422			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.1280 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	60.5702 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.7831	50.8363	49.9083	45.5491	44.7336	40.9369	40.9369	40.2338	42.3993	44.7336	46.3835	48.1084	(38)
Heat transfer coeff	112.3534	111.4066	110.4785	106.1194	105.3038	101.5071	101.5071	100.8041	102.9696	105.3038	106.9537	108.6786	(39)
Average = Sum(39)m / 12 =												106.1155	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0365	2.0193	2.0025	1.9235	1.9087	1.8399	1.8399	1.8272	1.8664	1.9087	1.9386	1.9699	(40)
HLP (average)												1.9234	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8423	(42)
Hot water usage for mixer showers													
	61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												87.5198	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	
Distribution loss (46)m = 0.15 x (45)m													
	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
										Total per year (kWh/year) = Sum(64)m =		1716.6163	(64)
12Total per year (kWh/year)												1717	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.0909	60.2781	64.1937	56.8173	55.3341	50.1420	49.6902	51.5035	51.8927	57.5299	60.7649	67.3966	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	84.5308	93.5876	84.5308	87.3484	84.5308	87.3484	84.5308	84.5308	87.3484	84.5308	87.3484	84.5308	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	160.6236	162.2904	158.0902	149.1484	137.8611	127.2526	120.1654	118.4987	122.6989	131.6406	142.9280	153.5365	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	91.5201	89.6995	86.2818	78.9130	74.3738	69.6417	66.7879	69.2251	72.0732	77.3251	84.3957	90.5868	(72)
Total internal gains													
	387.3095	396.2126	379.5378	366.0449	347.4008	334.8778	322.1192	322.8896	332.7556	344.1315	365.3072	379.2892	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northwest	2.3600	11.2829	0.7600	0.8000	0.7700	11.2194	(81)

Solar gains	36.7009	74.7057	134.5959	221.0451	297.1280	316.7699	296.3318	236.2391	164.0072	91.2963	46.1792	29.9718	(83)
Total gains	424.0104	470.9183	514.1337	587.0901	644.5288	651.6477	618.4510	559.1288	496.7628	435.4278	411.4864	409.2610	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.1000	34.3898	34.6787	36.1032	36.3828	37.7436	37.7436	38.0069	37.2076	36.3828	35.8216	35.2530	
alpha	3.2733	3.2927	3.3119	3.4069	3.4255	3.5162	3.5162	3.5338	3.4805	3.4255	3.3881	3.3502	
util living area													
	0.9940	0.9909	0.9841	0.9610	0.9032	0.7774	0.6392	0.7016	0.8916	0.9740	0.9907	0.9948	(86)
MIT	18.5662	18.7741	19.1567	19.7741	20.3220	20.7530	20.9114	20.8765	20.5401	19.8544	19.1668	18.6017	(87)
Th 2	19.3091	19.3205	19.3317	19.3848	19.3949	19.4422	19.4422	19.4511	19.4239	19.3949	19.3746	19.3535	(88)
util rest of house													
	0.9918	0.9875	0.9776	0.9431	0.8533	0.6588	0.4489	0.5180	0.8134	0.9586	0.9864	0.9929	(89)
MIT 2	16.5919	16.8634	17.3569	18.1633	18.8247	19.3044	19.4181	19.4113	19.1060	18.2805	17.3974	16.6624	(90)

Living area fraction										fLA = Living area / (4) =		0.3999	(91)
MIT	17.3813	17.6274	18.0766	18.8074	19.4234	19.8836	20.0152	19.9971	19.6795	18.9098	18.1049	17.4378	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.3813	17.6274	18.0766	18.8074	19.4234	19.8836	20.0152	19.9971	19.6795	18.9098	18.1049	17.4378	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9878	0.9821	0.9702	0.9343	0.8545	0.6975	0.5258	0.5911	0.8296	0.9518	0.9813	0.9893	(94)
Useful gains	418.8277	462.4990	498.8014	548.5171	550.7197	454.5336	325.1949	330.5123	412.1081	414.4446	403.8048	404.9020	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1469.7336	1417.9182	1278.9613	1051.3630	813.3029	536.3277	346.6685	362.6043	574.5138	875.0559	1177.0140	1438.6702	(97)
Space heating kWh	781.8740	642.0417	580.4390	362.0490	195.3619	0.0000	0.0000	0.0000	0.0000	342.6948	556.7106	769.1235	(98a)
Space heating requirement - total per year (kWh/year)												4230.2945	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	781.8740	642.0417	580.4390	362.0490	195.3619	0.0000	0.0000	0.0000	0.0000	342.6948	556.7106	769.1235	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4230.2945	
Space heating per m2											(98c) / (4) =	76.6774	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	781.8740	642.0417	580.4390	362.0490	195.3619	0.0000	0.0000	0.0000	0.0000	342.6948	556.7106	769.1235	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	781.8740	642.0417	580.4390	362.0490	195.3619	0.0000	0.0000	0.0000	0.0000	342.6948	556.7106	769.1235	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.3432	13.1112	11.8051	8.6489	6.6807	5.4582	6.0944	7.9217	10.2895	13.5003	15.2486	16.7975	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4230.2945	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1716.6163	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	131.8993	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6078.8101	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4230.2945	0.1543	652.5770	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1716.6163	0.1412	242.3129	(264)

Space and water heating			894.8899	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.8993	0.1443	19.0371	(268)
Total CO2, kg/year			913.9270	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			16.5700	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4230.2945	1.5711	6646.3433	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1716.6163	1.5220	2612.6230	(278)
Space and water heating			9258.9663	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	131.8993	1.5338	202.3115	(282)
Total Primary energy kWh/year			9461.2778	(286)
Dwelling Primary energy Rate (DPER)			171.4900	(287)

Full SAP Calculation Printout

Property Reference	Apt. 6	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 6	**Prop Type Ref**	
Property			

SAP Rating	43 E	**DER**	16.57	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.86	**DFEE**	83.78	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	171.49	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8704 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9433	0.9248	0.9063	0.8139	0.7954	0.7029	0.7029	0.6844	0.7399	0.7954	0.8324	0.8693	(22b)

If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a) 0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) = 0.0000 (23c)

Effective ac	0.9449	0.9277	0.9107	0.8312	0.8163	0.7470	0.7470	0.7342	0.7737	0.8163	0.8464	0.8779	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			120.6400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4422			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.1280 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	60.5702 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.7831	50.8363	49.9083	45.5491	44.7336	40.9369	40.9369	40.2338	42.3993	44.7336	46.3835	48.1084	(38)
Heat transfer coeff													

	112.3534	111.4066	110.4785	106.1194	105.3038	101.5071	101.5071	100.8041	102.9696	105.3038	106.9537	108.6786	(39)
Average = Sum(39)m / 12 =												106.1155	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0365	2.0193	2.0025	1.9235	1.9087	1.8399	1.8399	1.8272	1.8664	1.9087	1.9386	1.9699	(40)
HLP (average)												1.9234	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8423	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	23.8221	23.4683	22.9701	22.0515	21.3636	20.6009	20.1890	20.6837	21.2223	22.0385	22.9760	23.7416	(42b)
Hot water usage for other uses													
	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												52.5390	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	57.3195	55.7476	54.0313	51.8946	49.9887	48.0079	47.5959	49.3087	51.0655	53.0997	55.2553	57.2390	(44)
Energy conte	90.7801	79.3839	83.0441	71.0412	67.2944	59.0313	57.5631	61.0545	62.9688	72.0558	78.7213	89.6224	(45)
Energy content (annual)										Total = Sum(45)m =		872.5609	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	77.1631	67.4763	70.5875	60.3850	57.2002	50.1766	48.9287	51.8963	53.5235	61.2474	66.9131	76.1790	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	77.1631	67.4763	70.5875	60.3850	57.2002	50.1766	48.9287	51.8963	53.5235	61.2474	66.9131	76.1790	(64)
										Total per year (kWh/year) = Sum(64)m =		741.6768	(64)
12Total per year (kWh/year)												742	(64)
Electric shower(s)													
	44.1335	39.3233	42.9396	40.9767	41.7456	39.8213	41.1486	41.7456	40.9767	42.9396	42.1321	44.1335	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						502.0162	(64a)
Heat gains from water heating, kWh/month													
	30.3241	26.6999	28.3818	25.3404	24.7365	22.4995	22.5193	23.4105	23.6251	26.0467	27.2613	30.0781	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	84.5308	93.5876	84.5308	87.3484	84.5308	87.3484	84.5308	84.5308	87.3484	84.5308	87.3484	84.5308	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	160.6236	162.2904	158.0902	149.1484	137.8611	127.2526	120.1654	118.4987	122.6989	131.6406	142.9280	153.5365	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	40.7583	39.7320	38.1475	35.1950	33.2479	31.2493	30.2679	31.4657	32.8126	35.0091	37.8629	40.4276	(72)
Total internal gains													
	336.5477	346.2451	331.4036	322.3270	306.2749	296.4854	285.5992	285.1302	293.4950	301.8155	318.7744	329.1299	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northwest	2.3600	11.2829	0.7600	0.8000	0.7700	11.2194	(81)

Solar gains	36.7009	74.7057	134.5959	221.0451	297.1280	316.7699	296.3318	236.2391	164.0072	91.2963	46.1792	29.9718	(83)
Total gains	373.2486	420.9508	465.9995	543.3722	603.4029	613.2553	581.9310	521.3694	457.5022	393.1118	364.9536	359.1017	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.1000	34.3898	34.6787	36.1032	36.3828	37.7436	37.7436	38.0069	37.2076	36.3828	35.8216	35.2530	
alpha	3.2733	3.2927	3.3119	3.4069	3.4255	3.5162	3.5162	3.5338	3.4805	3.4255	3.3881	3.3502	
util living area													
	0.9959	0.9935	0.9881	0.9685	0.9172	0.8005	0.6666	0.7317	0.9106	0.9806	0.9935	0.9965	(86)
MIT	18.4830	18.6928	19.0801	19.7094	20.2730	20.7260	20.8986	20.8578	20.4949	19.7885	19.0902	18.5183	(87)
Th 2	19.3091	19.3205	19.3317	19.3848	19.3949	19.4422	19.4422	19.4511	19.4239	19.3949	19.3746	19.3535	(88)
util rest of house													
	0.9944	0.9910	0.9830	0.9535	0.8724	0.6858	0.4736	0.5487	0.8412	0.9687	0.9905	0.9952	(89)
MIT 2	17.1090	17.3254	17.7178	18.3723	18.9102	19.3198	19.4200	19.4139	19.1432	18.4640	17.7583	17.1735	(90)
Living area fraction										fLA = Living area / (4) =		0.3999	(91)
MIT	17.6584	17.8722	18.2626	18.9069	19.4551	19.8821	20.0112	19.9912	19.6837	18.9936	18.2909	17.7113	(92)

Temperature adjustment												0.0000	
adjusted MIT	17.6584	17.8722	18.2626	18.9069	19.4551	19.8821	20.0112	19.9912	19.6837	18.9936	18.2909	17.7113	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9921	0.9877	0.9783	0.9474	0.8745	0.7236	0.5521	0.6220	0.8561	0.9644	0.9875	0.9932	(94)
Useful gains	370.2923	415.7861	455.8684	514.8172	527.6824	443.7737	321.2699	324.3112	391.6584	379.1209	360.3934	356.6734	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1500.8581	1445.1844	1299.5095	1061.9293	816.6449	536.1659	346.2630	362.0101	574.9463	883.8772	1196.9050	1468.3858	(97)
Space heating kWh													
	841.1409	691.7556	627.6690	393.9208	214.9881	0.0000	0.0000	0.0000	0.0000	375.5387	602.2884	827.1141	(98a)
Space heating requirement - total per year (kWh/year)												4574.4156	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	841.1409	691.7556	627.6690	393.9208	214.9881	0.0000	0.0000	0.0000	0.0000	375.5387	602.2884	827.1141	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4574.4156	
Space heating per m2											(98c) / (4) =	82.9149	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	954.1672	751.1529	766.1109	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6356	0.7184	0.6608	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	606.4672	539.6185	506.2379	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	683.5683	648.7161	579.5842	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	55.5128	81.1686	54.5697	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction											fC = cooled area / (4) =	1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	13.8782	20.2922	13.6424	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												47.8128	(107)
Energy for space heating												82.9149	(99)
Energy for space cooling												0.8666	(108)
Total												83.7816	(109)
Fabric Energy Efficiency (DFEE)												83.8	(109)

Full SAP Calculation Printout

Property Reference	Apt. 6	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 6	**Prop Type Ref**	
Property			

SAP Rating	43 E	**DER**	16.57	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.86	**DFEE**	83.78	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	171.49	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8704 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9433	0.9248	0.9063	0.8139	0.7954	0.7029	0.7029	0.6844	0.7399	0.7954	0.8324	0.8693	(22b)
Effective ac	0.9449	0.9277	0.9107	0.8312	0.8163	0.7470	0.7470	0.7342	0.7737	0.8163	0.8464	0.8779	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			120.6400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4422			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.1280 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	60.5702 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.7831	50.8363	49.9083	45.5491	44.7336	40.9369	40.9369	40.2338	42.3993	44.7336	46.3835	48.1084	(38)
Heat transfer coeff	112.3534	111.4066	110.4785	106.1194	105.3038	101.5071	101.5071	100.8041	102.9696	105.3038	106.9537	108.6786	(39)
Average = Sum(39)m / 12 =												106.1155	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0365	2.0193	2.0025	1.9235	1.9087	1.8399	1.8399	1.8272	1.8664	1.9087	1.9386	1.9699	(40)
HLP (average)												1.9234	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8423	(42)
Hot water usage for mixer showers													
	61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												87.5198	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	
Distribution loss (46)m = 0.15 x (45)m													
	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
										Total per year (kWh/year) = Sum(64)m =		1716.6163	(64)
12Total per year (kWh/year)												1717	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.0909	60.2781	64.1937	56.8173	55.3341	50.1420	49.6902	51.5035	51.8927	57.5299	60.7649	67.3966	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	84.5308	93.5876	84.5308	87.3484	84.5308	87.3484	84.5308	84.5308	87.3484	84.5308	87.3484	84.5308	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	160.6236	162.2904	158.0902	149.1484	137.8611	127.2526	120.1654	118.4987	122.6989	131.6406	142.9280	153.5365	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	91.5201	89.6995	86.2818	78.9130	74.3738	69.6417	66.7879	69.2251	72.0732	77.3251	84.3957	90.5868	(72)
Total internal gains													
	387.3095	396.2126	379.5378	366.0449	347.4008	334.8778	322.1192	322.8896	332.7556	344.1315	365.3072	379.2892	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northwest	2.3600	11.2829	0.7600	0.8000	0.7700	11.2194	(81)

Solar gains	36.7009	74.7057	134.5959	221.0451	297.1280	316.7699	296.3318	236.2391	164.0072	91.2963	46.1792	29.9718	(83)
Total gains	424.0104	470.9183	514.1337	587.0901	644.5288	651.6477	618.4510	559.1288	496.7628	435.4278	411.4864	409.2610	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.1000	34.3898	34.6787	36.1032	36.3828	37.7436	37.7436	38.0069	37.2076	36.3828	35.8216	35.2530	
alpha	3.2733	3.2927	3.3119	3.4069	3.4255	3.5162	3.5162	3.5338	3.4805	3.4255	3.3881	3.3502	
util living area													
	0.9940	0.9909	0.9841	0.9610	0.9032	0.7774	0.6392	0.7016	0.8916	0.9740	0.9907	0.9948	(86)
MIT	18.5662	18.7741	19.1567	19.7741	20.3220	20.7530	20.9114	20.8765	20.5401	19.8544	19.1668	18.6017	(87)
Th 2	19.3091	19.3205	19.3317	19.3848	19.3949	19.4422	19.4422	19.4511	19.4239	19.3949	19.3746	19.3535	(88)
util rest of house													
	0.9918	0.9875	0.9776	0.9431	0.8533	0.6588	0.4489	0.5180	0.8134	0.9586	0.9864	0.9929	(89)
MIT 2	16.5919	16.8634	17.3569	18.1633	18.8247	19.3044	19.4181	19.4113	19.1060	18.2805	17.3974	16.6624	(90)

Living area fraction										fLA = Living area / (4) =		0.3999	(91)
MIT	17.3813	17.6274	18.0766	18.8074	19.4234	19.8836	20.0152	19.9971	19.6795	18.9098	18.1049	17.4378	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.3813	17.6274	18.0766	18.8074	19.4234	19.8836	20.0152	19.9971	19.6795	18.9098	18.1049	17.4378	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9878	0.9821	0.9702	0.9343	0.8545	0.6975	0.5258	0.5911	0.8296	0.9518	0.9813	0.9893	(94)
Useful gains	418.8277	462.4990	498.8014	548.5171	550.7197	454.5336	325.1949	330.5123	412.1081	414.4446	403.8048	404.9020	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1469.7336	1417.9182	1278.9613	1051.3630	813.3029	536.3277	346.6685	362.6043	574.5138	875.0559	1177.0140	1438.6702	(97)
Space heating kWh	781.8740	642.0417	580.4390	362.0490	195.3619	0.0000	0.0000	0.0000	0.0000	342.6948	556.7106	769.1235	(98a)
Space heating requirement - total per year (kWh/year)												4230.2945	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	781.8740	642.0417	580.4390	362.0490	195.3619	0.0000	0.0000	0.0000	0.0000	342.6948	556.7106	769.1235	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4230.2945	
Space heating per m2											(98c) / (4) =	76.6774	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	781.8740	642.0417	580.4390	362.0490	195.3619	0.0000	0.0000	0.0000	0.0000	342.6948	556.7106	769.1235	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	781.8740	642.0417	580.4390	362.0490	195.3619	0.0000	0.0000	0.0000	0.0000	342.6948	556.7106	769.1235	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.3432	13.1112	11.8051	8.6489	6.6807	5.4582	6.0944	7.9217	10.2895	13.5003	15.2486	16.7975	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4230.2945	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1716.6163	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	131.8993	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6078.8101	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4230.2945	0.1543	652.5770	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1716.6163	0.1412	242.3129	(264)

Space and water heating			894.8899	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.8993	0.1443	19.0371	(268)
Total CO2, kg/year			913.9270	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			16.5700	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4230.2945	1.5711	6646.3433	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1716.6163	1.5220	2612.6230	(278)
Space and water heating			9258.9663	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	131.8993	1.5338	202.3115	(282)
Total Primary energy kWh/year			9461.2778	(286)
Dwelling Primary energy Rate (DPER)			171.4900	(287)

Full SAP Calculation Printout

Property Reference	Apt. 6	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 6	**Prop Type Ref**	
Property			

SAP Rating	43 E	**DER**	16.57	**TER**	
Environmental	88 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.86	**DFEE**	83.78	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	171.49	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		55.1700 (1b)	x	3.0100 (2b)	=	166.0617	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	166.0617	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8704	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9433	0.9248	0.9063	0.8139	0.7954	0.7029	0.7029	0.6844	0.7399	0.7954	0.8324	0.8693	(22b)
Effective ac	0.9449	0.9277	0.9107	0.8312	0.8163	0.7470	0.7470	0.7342	0.7737	0.8163	0.8464	0.8779	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			120.6400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4422			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		24.1280	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	60.5702	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.7831	50.8363	49.9083	45.5491	44.7336	40.9369	40.9369	40.2338	42.3993	44.7336	46.3835	48.1084	(38)
Heat transfer coeff	112.3534	111.4066	110.4785	106.1194	105.3038	101.5071	101.5071	100.8041	102.9696	105.3038	106.9537	108.6786	(39)
Average = Sum(39)m / 12 =												106.1155	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0365	2.0193	2.0025	1.9235	1.9087	1.8399	1.8399	1.8272	1.8664	1.9087	1.9386	1.9699	(40)
HLP (average)												1.9234	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8423	(42)
Hot water usage for mixer showers													
	61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												87.5198	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	
Distribution loss (46)m = 0.15 x (45)m													
	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
										Total per year (kWh/year) = Sum(64)m =		1716.6163	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.0909	60.2781	64.1937	56.8173	55.3341	50.1420	49.6902	51.5035	51.8927	57.5299	60.7649	67.3966	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.6717	16.5840	13.4871	10.2106	7.6325	6.4437	6.9626	9.0503	12.1473	15.4238	18.0018	19.1907	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	239.7368	242.2245	235.9555	222.6096	205.7628	189.9292	179.3514	176.8637	183.1327	196.4785	213.3253	229.1589	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	91.5201	89.6995	86.2818	78.9130	74.3738	69.6417	66.7879	69.2251	72.0732	77.3251	84.3957	90.5868	(72)
Total internal gains													
	434.6717	433.2512	420.4675	396.4763	372.5123	350.7578	337.8451	339.8823	352.0963	373.9706	400.4660	423.6796	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northwest	2.3600	11.2829	0.7600	0.8000	0.7700	11.2194	(81)

Solar gains	36.7009	74.7057	134.5959	221.0451	297.1280	316.7699	296.3318	236.2391	164.0072	91.2963	46.1792	29.9718	(83)
Total gains	471.3726	507.9569	555.0634	617.5214	669.6404	667.5277	634.1769	576.1214	516.1035	465.2668	446.6452	453.6514	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.1000	34.3898	34.6787	36.1032	36.3828	37.7436	37.7436	38.0069	37.2076	36.3828	35.8216	35.2530	
alpha	3.2733	3.2927	3.3119	3.4069	3.4255	3.5162	3.5162	3.5338	3.4805	3.4255	3.3881	3.3502	
util living area													
	0.9918	0.9887	0.9803	0.9554	0.8944	0.7679	0.6279	0.6884	0.8818	0.9687	0.9880	0.9929	(86)
MIT	18.6432	18.8337	19.2209	19.8179	20.3506	20.7634	20.9164	20.8840	20.5611	19.8998	19.2240	18.6748	(87)
Th 2	19.3091	19.3205	19.3317	19.3848	19.3949	19.4422	19.4422	19.4511	19.4239	19.3949	19.3746	19.3535	(88)
util rest of house													
	0.9888	0.9845	0.9723	0.9353	0.8415	0.6480	0.4389	0.5051	0.7996	0.9506	0.9827	0.9903	(89)
MIT 2	16.6897	16.9388	17.4369	18.2155	18.8542	19.3116	19.4197	19.4143	19.1250	18.3350	17.4694	16.7555	(90)
Living area fraction									fLA = Living area / (4) =			0.3999	(91)

MIT	17.4709	17.6965	18.1502	18.8562	19.4526	19.8921	20.0182	20.0019	19.6992	18.9607	18.1710	17.5230	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4709	17.6965	18.1502	18.8562	19.4526	19.8921	20.0182	20.0019	19.6992	18.9607	18.1710	17.5230	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9838	0.9782	0.9640	0.9264	0.8438	0.6876	0.5153	0.5782	0.8177	0.9436	0.9768	0.9858	(94)
Useful gains	463.7205	496.8900	535.0540	572.0840	565.0758	459.0137	326.7951	333.1283	422.0283	439.0231	436.2752	447.2289	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1479.7905	1425.6164	1287.0981	1056.5475	816.3734	537.1856	346.9686	363.0903	576.5521	880.4101	1184.0828	1447.9214	(97)
Space heating kWh													
	755.9561	624.1041	559.5208	348.8137	186.9654	0.0000	0.0000	0.0000	0.0000	328.3919	538.4215	744.5152	(98a)
Space heating requirement - total per year (kWh/year)												4086.6887	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	755.9561	624.1041	559.5208	348.8137	186.9654	0.0000	0.0000	0.0000	0.0000	328.3919	538.4215	744.5152	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4086.6887	
Space heating per m2											(98c) / (4) =	74.0745	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	755.9561	624.1041	559.5208	348.8137	186.9654	0.0000	0.0000	0.0000	0.0000	328.3919	538.4215	744.5152	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	755.9561	624.1041	559.5208	348.8137	186.9654	0.0000	0.0000	0.0000	0.0000	328.3919	538.4215	744.5152	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.3432	13.1112	11.8051	8.6489	6.6807	5.4582	6.0944	7.9217	10.2895	13.5003	15.2486	16.7975	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4086.6887	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1716.6163	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	131.8993	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5935.2042	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4086.6887	16.4900	673.8950	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1716.6163	16.4900	283.0700	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	131.8993	16.4900	21.7502	(250)
Additional standing charges			0.0000	(251)
Total energy cost			978.7152	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):			0.3600 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =		3.5174 (257)
SAP value			42.9804
SAP rating (Section 12)			43 (258)
SAP band			E

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4086.6887	0.1543	630.5629	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1716.6163	0.1412	242.3129	(264)
Space and water heating			872.8758	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.8993	0.1443	19.0371	(268)
Total CO2, kg/year			891.9129	(272)
CO2 emissions per m2			16.1700	(273)
EI value			88.0687	
EI rating			88	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b) x	3.0100	(2b) =	166.0617	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8704	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8878	0.8693	0.8509	0.7769	0.7584	0.6844	0.6844	0.6844	0.6844	0.7769	0.7954	0.8324	(22b)
Effective ac	0.8941	0.8779	0.8620	0.8018	0.7876	0.7342	0.7342	0.7342	0.7342	0.8018	0.8163	0.8464	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			120.6400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4422			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area) 24.1280 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 60.5702 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	48.9989	48.1084	47.2365	43.9367	43.1586	40.2338	40.2338	40.2338	40.2338	43.9367	44.7336	46.3835	(38)
Heat transfer coeff	109.5692	108.6786	107.8068	104.5070	103.7289	100.8041	100.8041	100.8041	100.8041	104.5070	105.3038	106.9537	(39)

Average = Sum(39)m / 12 = 104.5226

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9860	1.9699	1.9541	1.8943	1.8802	1.8272	1.8272	1.8272	1.8272	1.8943	1.9087	1.9386	(40)
HLP (average)												1.8946	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8423 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)

Average daily hot water use (litres/day) 87.5198 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	
Distribution loss (46)m = 0.15 x (45)m	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)

Water storage loss:

Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)
Temperature factor from Table 2b 0.6000 (49)
Enter (49) or (54) in (55) 0.7200 (55)

Total storage loss

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
								Total per year (kWh/year) = Sum(64)m =			1716.6163	(64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

68.0909	60.2781	64.1937	56.8173	55.3341	50.1420	49.6902	51.5035	51.8927	57.5299	60.7649	67.3966	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	18.6717	16.5840	13.4871	10.2106	7.6325	6.4437	6.9626	9.0503	12.1473	15.4238	18.0018	19.1907	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	239.7368	242.2245	235.9555	222.6096	205.7628	189.9292	179.3514	176.8637	183.1327	196.4785	213.3253	229.1589	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)	91.5201	89.6995	86.2818	78.9130	74.3738	69.6417	66.7879	69.2251	72.0732	77.3251	84.3957	90.5868	(72)
Total internal gains	434.6717	433.2512	420.4675	396.4763	372.5123	350.7578	337.8451	339.8823	352.0963	373.9706	400.4660	423.6796	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Northwest	2.3600	10.4150	0.7600	0.8000	0.7700	10.3564	(81)

Solar gains	33.8777	70.5554	133.1939	223.9924	295.5805	321.5215	291.6281	228.7156	164.0072	89.9130	43.3805	28.5446	(83)
Total gains	468.5494	503.8066	553.6614	620.4687	668.0928	672.2792	629.4732	568.5979	516.1035	463.8836	443.8465	452.2241	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9665	35.2530	35.5381	36.6602	36.9352	38.0069	38.0069	38.0069	38.0069	36.6602	36.3828	35.8216	
alpha	3.3311	3.3502	3.3692	3.4440	3.4623	3.5338	3.5338	3.5338	3.5338	3.4440	3.4255	3.3881	
util living area													
	0.9914	0.9883	0.9794	0.9521	0.8848	0.7567	0.6488	0.7036	0.8788	0.9679	0.9872	0.9925	(86)
MIT	18.7717	18.9389	19.3063	19.8829	20.4128	20.7815	20.9044	20.8725	20.5814	19.9264	19.3211	18.7824	(87)
Th 2	19.3427	19.3535	19.3641	19.4048	19.4144	19.4511	19.4511	19.4511	19.4511	19.4048	19.3949	19.3746	(88)
util rest of house													
	0.9882	0.9839	0.9710	0.9305	0.8271	0.6337	0.4679	0.5247	0.7963	0.9493	0.9813	0.9897	(89)
MIT 2	16.8730	17.0920	17.5642	18.3079	18.9379	19.3336	19.4221	19.4082	19.1660	18.3742	17.6052	16.9053	(90)
Living area fraction										fLA = Living area / (4) =		0.3999	(91)
MIT	17.6322	17.8305	18.2607	18.9377	19.5277	19.9125	20.0148	19.9937	19.7320	18.9949	18.2913	17.6559	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.6322	17.8305	18.2607	18.9377	19.5277	19.9125	20.0148	19.9937	19.7320	18.9949	18.2913	17.6559	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9831	0.9777	0.9628	0.9221	0.8322	0.6754	0.5403	0.5955	0.8150	0.9425	0.9753	0.9851	(94)
Useful gains	460.6232	492.5634	533.0746	572.1309	555.9568	454.0429	340.1192	338.6060	420.6233	437.1909	432.8720	445.4709	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1416.9717	1372.6621	1246.3269	1028.1075	780.8367	525.4443	364.3879	372.3448	567.7247	866.8722	1136.3658	1396.3727	(97)
Space heating kWh													
	711.5233	591.4263	530.6597	328.3032	167.3107	0.0000	0.0000	0.0000	0.0000	319.6829	506.5155	707.4709	(98a)
Space heating requirement - total per year (kWh/year)												3862.8924	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	711.5233	591.4263	530.6597	328.3032	167.3107	0.0000	0.0000	0.0000	0.0000	319.6829	506.5155	707.4709	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3862.8924	
Space heating per m2											(98c) / (4) =	70.0180	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	711.5233	591.4263	530.6597	328.3032	167.3107	0.0000	0.0000	0.0000	0.0000	319.6829	506.5155	707.4709	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	711.5233	591.4263	530.6597	328.3032	167.3107	0.0000	0.0000	0.0000	0.0000	319.6829	506.5155	707.4709	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.3432	13.1112	11.8051	8.6489	6.6807	5.4582	6.0944	7.9217	10.2895	13.5003	15.2486	16.7975	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3862.8924	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1716.6163	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	131.8993	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5711.4080	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3862.8924	26.0600	1006.6698	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1716.6163	26.0600	447.3502	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	131.8993	26.0600	34.3730	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1488.3929	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3862.8924	0.1543	596.1083	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1716.6163	0.1412	242.3129	(264)
Space and water heating			838.4212	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.8993	0.1443	19.0371	(268)
Total CO2, kg/year			857.4583	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3862.8924	1.5713	6069.9092	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1716.6163	1.5220	2612.6230	(278)
Space and water heating			8682.5322	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	131.8993	1.5338	202.3115	(282)
Total Primary energy kWh/year			8884.8438	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 6

Current energy efficiency rating: E 43
Current environmental impact rating: B 88

N Solar water heating Not applicable
U Solar photovoltaic panels Not applicable
V2 Wind turbine Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures	Typical annual savings		Energy efficiency	Environmental impact
(none)				
Total Savings	£0	0.00 kg/m²		

Potential energy efficiency rating: E 43
Potential environmental impact rating: B 88

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£1488	£1488	£0
Space heating	£1007	£1007	£0
Water heating	£447	£447	£0
Lighting	£34	£34	£0
Total cost of fuels	£1488	£1488	£0
Total cost of uses	£1488	£1488	£0
Delivered energy	104 kWh/m²	104 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.9 tonnes	0.9 tonnes	0.0 tonnes
CO2 emissions per m²	16 kg/m²	16 kg/m²	0 kg/m²
Primary energy	161 kWh/m²	161 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8704 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9433	0.9248	0.9063	0.8139	0.7954	0.7029	0.7029	0.6844	0.7399	0.7954	0.8324	0.8693	(22b)
Effective ac	0.9449	0.9277	0.9107	0.8312	0.8163	0.7470	0.7470	0.7342	0.7737	0.8163	0.8464	0.8779	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			120.6400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4422			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		24.1280 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	60.5702 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.7831	50.8363	49.9083	45.5491	44.7336	40.9369	40.9369	40.2338	42.3993	44.7336	46.3835	48.1084	(38)
Heat transfer coeff	112.3534	111.4066	110.4785	106.1194	105.3038	101.5071	101.5071	100.8041	102.9696	105.3038	106.9537	108.6786	(39)
Average = Sum(39)m / 12 =												106.1155	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0365	2.0193	2.0025	1.9235	1.9087	1.8399	1.8399	1.8272	1.8664	1.9087	1.9386	1.9699	(40)
HLP (average)												1.9234	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.8423 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)

Average daily hot water use (litres/day)	87.5198 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)											Total = Sum(45)m =	1453.8163	
Distribution loss (46)m = 0.15 x (45)m	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)

Water storage loss:	
Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2000 (48)
Temperature factor from Table 2b	0.6000 (49)
Enter (49) or (54) in (55)	0.7200 (55)

Total storage loss

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)

Primary loss

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)

Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
											Total per year (kWh/year) = Sum(64)m =	1716.6163	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.0909	60.2781	64.1937	56.8173	55.3341	50.1420	49.6902	51.5035	51.8927	57.5299	60.7649	67.3966	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.6717	16.5840	13.4871	10.2106	7.6325	6.4437	6.9626	9.0503	12.1473	15.4238	18.0018	19.1907	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	239.7368	242.2245	235.9555	222.6096	205.7628	189.9292	179.3514	176.8637	183.1327	196.4785	213.3253	229.1589	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	91.5201	89.6995	86.2818	78.9130	74.3738	69.6417	66.7879	69.2251	72.0732	77.3251	84.3957	90.5868	(72)
Total internal gains													
	434.6717	433.2512	420.4675	396.4763	372.5123	350.7578	337.8451	339.8823	352.0963	373.9706	400.4660	423.6796	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northwest	2.3600	11.2829	0.7600	0.8000	0.7700	11.2194	(81)

Solar gains	36.7009	74.7057	134.5959	221.0451	297.1280	316.7699	296.3318	236.2391	164.0072	91.2963	46.1792	29.9718	(83)
Total gains	471.3726	507.9569	555.0634	617.5214	669.6404	667.5277	634.1769	576.1214	516.1035	465.2668	446.6452	453.6514	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.1000	34.3898	34.6787	36.1032	36.3828	37.7436	37.7436	38.0069	37.2076	36.3828	35.8216	35.2530	
alpha	3.2733	3.2927	3.3119	3.4069	3.4255	3.5162	3.5162	3.5338	3.4805	3.4255	3.3881	3.3502	
util living area													
	0.9918	0.9887	0.9803	0.9554	0.8944	0.7679	0.6279	0.6884	0.8818	0.9687	0.9880	0.9929	(86)
MIT	18.6432	18.8337	19.2209	19.8179	20.3506	20.7634	20.9164	20.8840	20.5611	19.8998	19.2240	18.6748	(87)
Th 2	19.3091	19.3205	19.3317	19.3848	19.3949	19.4422	19.4422	19.4511	19.4239	19.3949	19.3746	19.3535	(88)
util rest of house													
	0.9888	0.9845	0.9723	0.9353	0.8415	0.6480	0.4389	0.5051	0.7996	0.9506	0.9827	0.9903	(89)
MIT 2	16.6897	16.9388	17.4369	18.2155	18.8542	19.3116	19.4197	19.4143	19.1250	18.3350	17.4694	16.7555	(90)
Living area fraction										fLA = Living area / (4) =		0.3999	(91)
MIT	17.4709	17.6965	18.1502	18.8562	19.4526	19.8921	20.0182	20.0019	19.6992	18.9607	18.1710	17.5230	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4709	17.6965	18.1502	18.8562	19.4526	19.8921	20.0182	20.0019	19.6992	18.9607	18.1710	17.5230	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9838	0.9782	0.9640	0.9264	0.8438	0.6876	0.5153	0.5782	0.8177	0.9436	0.9768	0.9858	(94)
Useful gains	463.7205	496.8900	535.0540	572.0840	565.0758	459.0137	326.7951	333.1283	422.0283	439.0231	436.2752	447.2289	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1479.7905	1425.6164	1287.0981	1056.5475	816.3734	537.1856	346.9686	363.0903	576.5521	880.4101	1184.0828	1447.9214	(97)
Space heating kWh													
	755.9561	624.1041	559.5208	348.8137	186.9654	0.0000	0.0000	0.0000	0.0000	328.3919	538.4215	744.5152	(98a)
Space heating requirement - total per year (kWh/year)												4086.6887	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	755.9561	624.1041	559.5208	348.8137	186.9654	0.0000	0.0000	0.0000	0.0000	328.3919	538.4215	744.5152	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4086.6887	
Space heating per m2											(98c) / (4) =	74.0745	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	755.9561	624.1041	559.5208	348.8137	186.9654	0.0000	0.0000	0.0000	0.0000	328.3919	538.4215	744.5152	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	755.9561	624.1041	559.5208	348.8137	186.9654	0.0000	0.0000	0.0000	0.0000	328.3919	538.4215	744.5152	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.3432	13.1112	11.8051	8.6489	6.6807	5.4582	6.0944	7.9217	10.2895	13.5003	15.2486	16.7975	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4086.6887	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1716.6163	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	131.8993	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5935.2042	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4086.6887	16.4900	673.8950	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1716.6163	16.4900	283.0700	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	131.8993	16.4900	21.7502	(250)
Additional standing charges			0.0000	(251)
Total energy cost			978.7152	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):	0.3600	(256)
Energy cost factor (ECF) [(255) x (256)] / [(4) + 45.0] =	3.5174	(257)
SAP value	42.9804	
SAP rating (Section 12)	43	(258)
SAP band	E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4086.6887	0.1543	630.5629	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1716.6163	0.1412	242.3129	(264)
Space and water heating			872.8758	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.8993	0.1443	19.0371	(268)
Total CO2, kg/year			891.9129	(272)
CO2 emissions per m2			16.1700	(273)
EI value			88.0687	
EI rating			88	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8704 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8878	0.8693	0.8509	0.7769	0.7584	0.6844	0.6844	0.6844	0.6844	0.7769	0.7954	0.8324	(22b)
Effective ac	0.8941	0.8779	0.8620	0.8018	0.7876	0.7342	0.7342	0.7342	0.7342	0.8018	0.8163	0.8464	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
Corridor Wall	20.8900	2.1000	18.7900	0.1800	3.3822			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			120.6400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.4422			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	24.1280	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 60.5702	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	48.9989	48.1084	47.2365	43.9367	43.1586	40.2338	40.2338	40.2338	40.2338	43.9367	44.7336	46.3835	(38)
Heat transfer coeff	109.5692	108.6786	107.8068	104.5070	103.7289	100.8041	100.8041	100.8041	100.8041	104.5070	105.3038	106.9537	(39)
Average = Sum(39)m / 12 =												104.5226	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9860	1.9699	1.9541	1.8943	1.8802	1.8272	1.8272	1.8272	1.8272	1.8943	1.9087	1.9386	(40)
HLP (average)												1.8946	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.8423	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												87.5198	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	

Distribution loss (46)m = 0.15 x (45)m

	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491 (46)

Water storage loss:

Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2000 (48)
Temperature factor from Table 2b	0.6000 (49)
Enter (49) or (54) in (55)	0.7200 (55)

Total storage loss

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200 (56)

If cylinder contains dedicated solar storage

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)

Total heat required for water heating calculated for each month

	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)

Output from w/h

	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143 (64)

Total per year (kWh/year) = Sum(64)m = 1716.6163 (64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

	68.0909	60.2781	64.1937	56.8173	55.3341	50.1420	49.6902	51.5035	51.8927	57.5299	60.7649	67.3966 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	18.6717	16.5840	13.4871	10.2106	7.6325	6.4437	6.9626	9.0503	12.1473	15.4238	18.0018	19.1907	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	239.7368	242.2245	235.9555	222.6096	205.7628	189.9292	179.3514	176.8637	183.1327	196.4785	213.3253	229.1589	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)

Water heating gains (Table 5)

	91.5201	89.6995	86.2818	78.9130	74.3738	69.6417	66.7879	69.2251	72.0732	77.3251	84.3957	90.5868	(72)

Total internal gains

	434.6717	433.2512	420.4675	396.4763	372.5123	350.7578	337.8451	339.8823	352.0963	373.9706	400.4660	423.6796	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Northwest	2.3600	10.4150	0.7600	0.8000	0.7700	10.3564	(81)

Solar gains	33.8777	70.5554	133.1939	223.9924	295.5805	321.5215	291.6281	228.7156	164.0072	89.9130	43.3805	28.5446	(83)
Total gains	468.5494	503.8066	553.6614	620.4687	668.0928	672.2792	629.4732	568.5979	516.1035	463.8836	443.8465	452.2241	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9665	35.2530	35.5381	36.6602	36.9352	38.0069	38.0069	38.0069	38.0069	36.6602	36.3828	35.8216	
alpha	3.3311	3.3502	3.3692	3.4440	3.4623	3.5338	3.5338	3.5338	3.5338	3.4440	3.4255	3.3881	
util living area	0.9914	0.9883	0.9794	0.9521	0.8848	0.7567	0.6488	0.7036	0.8788	0.9679	0.9872	0.9925	(86)
MIT	18.7717	18.9389	19.3063	19.8829	20.4128	20.7815	20.9044	20.8725	20.5814	19.9264	19.3211	18.7824	(87)
Th 2	19.3427	19.3535	19.3641	19.4048	19.4144	19.4511	19.4511	19.4511	19.4511	19.4048	19.3949	19.3746	(88)
util rest of house	0.9882	0.9839	0.9710	0.9305	0.8271	0.6337	0.4679	0.5247	0.7963	0.9493	0.9813	0.9897	(89)
MIT 2	16.8730	17.0920	17.5642	18.3079	18.9379	19.3336	19.4221	19.4082	19.1660	18.3742	17.6052	16.9053	(90)
Living area fraction									fLA = Living area / (4) =			0.3999	(91)
MIT	17.6322	17.8305	18.2607	18.9377	19.5277	19.9125	20.0148	19.9937	19.7320	18.9949	18.2913	17.6559	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.6322	17.8305	18.2607	18.9377	19.5277	19.9125	20.0148	19.9937	19.7320	18.9949	18.2913	17.6559	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9831	0.9777	0.9628	0.9221	0.8322	0.6754	0.5403	0.5955	0.8150	0.9425	0.9753	0.9851	(94)
Useful gains	460.6232	492.5634	533.0746	572.1309	555.9568	454.0429	340.1192	338.6060	420.6233	437.1909	432.8720	445.4709	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1416.9717	1372.6621	1246.3269	1028.1075	780.8367	525.4443	364.3879	372.3448	567.7247	866.8722	1136.3658	1396.3727	(97)
Space heating kWh	711.5233	591.4263	530.6597	328.3032	167.3107	0.0000	0.0000	0.0000	0.0000	319.6829	506.5155	707.4709	(98a)

Space heating requirement - total per year (kWh/year) 3862.8924

Solar heating kWh

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

	711.5233	591.4263	530.6597	328.3032	167.3107	0.0000	0.0000	0.0000	0.0000	319.6829	506.5155	707.4709	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 3862.8924

Space heating per m2 (98c) / (4) = 70.0180 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	711.5233	591.4263	530.6597	328.3032	167.3107	0.0000	0.0000	0.0000	0.0000	319.6829	506.5155	707.4709	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	711.5233	591.4263	530.6597	328.3032	167.3107	0.0000	0.0000	0.0000	0.0000	319.6829	506.5155	707.4709	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	173.4025	152.9422	161.6814	140.5093	135.0362	120.4331	118.0620	123.5155	125.6983	141.6399	152.3817	171.3143	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.3432	13.1112	11.8051	8.6489	6.6807	5.4582	6.0944	7.9217	10.2895	13.5003	15.2486	16.7975	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3862.8924	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1716.6163	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												131.8993	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5711.4080	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3862.8924	26.0600	1006.6698	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1716.6163	26.0600	447.3502	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	131.8993	26.0600	34.3730	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1488.3929	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3862.8924	0.1543	596.1083	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1716.6163	0.1412	242.3129	(264)
Space and water heating			838.4212	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	131.8993	0.1443	19.0371	(268)
Total CO2, kg/year			857.4583	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3862.8924	1.5713	6069.9092	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1716.6163	1.5220	2612.6230	(278)
Space and water heating			8682.5322	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	131.8993	1.5338	202.3115	(282)
Total Primary energy kWh/year			8884.8438	(286)

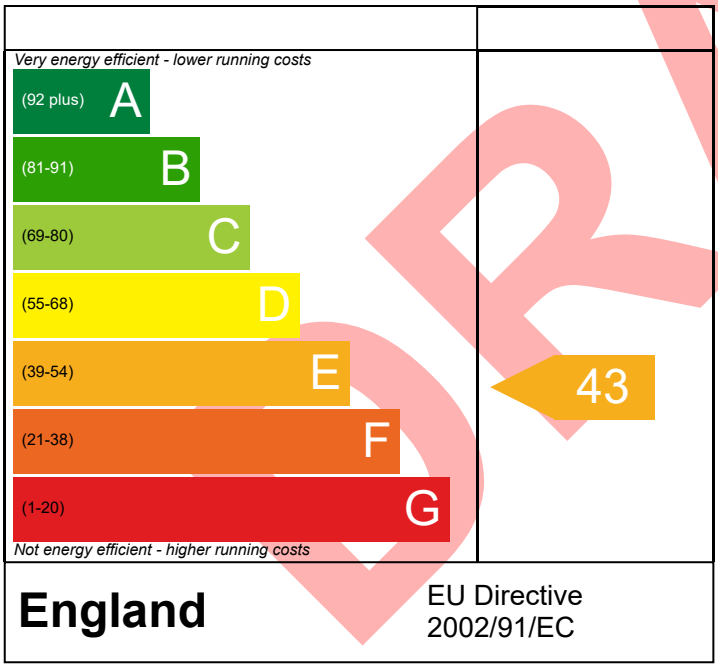
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	55.17 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

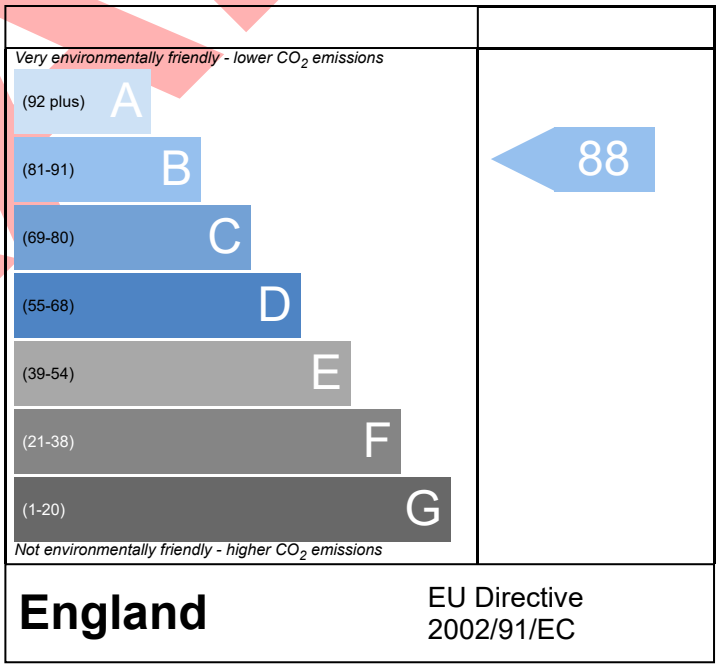
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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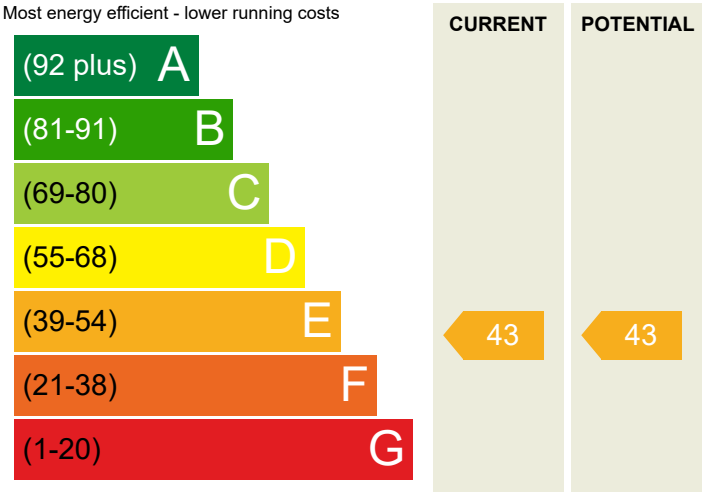
Energy Report

Dwelling Address	
Reference	Apt. 6-Apt. 6
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	55

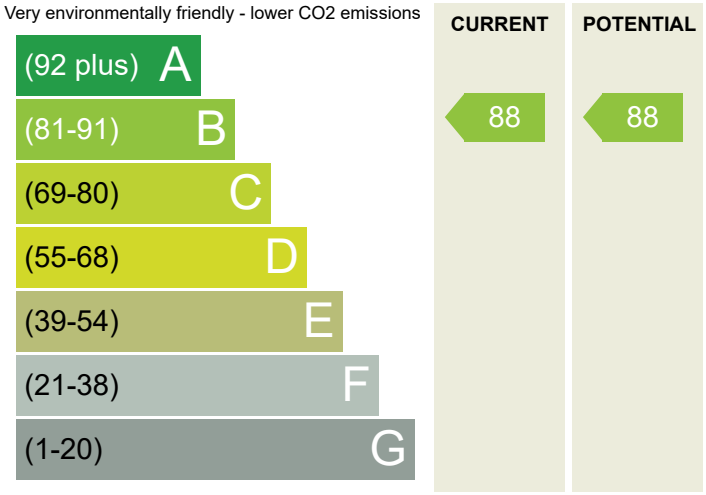
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

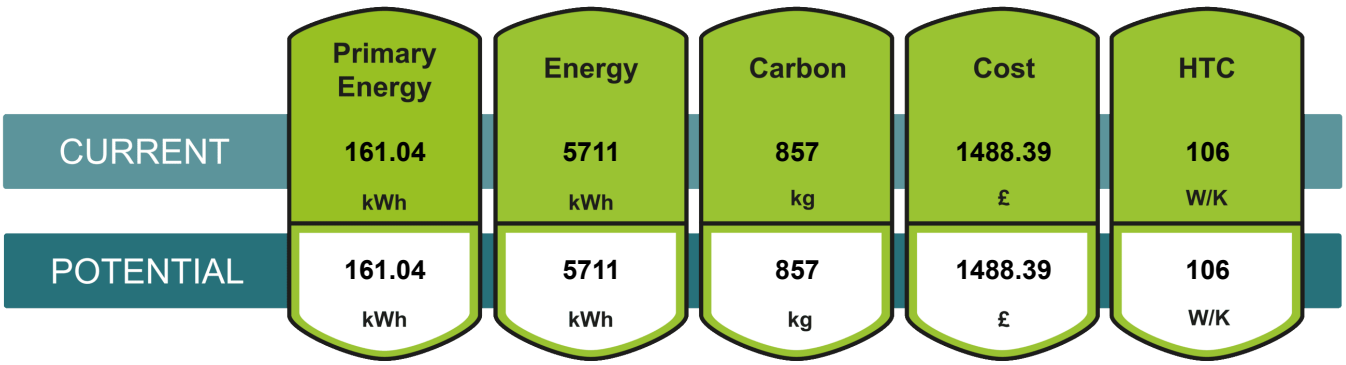
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.26 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£34	£34	You could save £0
Heating	£1007	£1007	
Hot Water	£447	£447	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1488	£1488	

Estimated energy use and potential savings

Space Heating
3863
kWh per year

Water Heating
1717
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 6	Issued on Date	01/10/2024
Assessment Reference	Apt. 6	Prop Type Ref	Detached Flat
Property			

SAP Rating	43 E	DER	16.57	TER	
Environmental	88 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.86	DFEE	83.78	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	171.49	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Southwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	44.58	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	20.89	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	55.17	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NE1	New Glazing	External Wall 1	North East	5.36
D SW	New Door	Corridor Wall	South West	2.10
W NW1	New Glazing	External Wall 1	North West	2.36

Comments

Thermal Bridging

Default

Y-value: 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing

No

Property Tested? Yes

Test Method: Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	100.00	10.00	1000.00	10

Comments

Main Heating 1

Fuel Type	SAP table	
Winter Efficiency	Electricity	
Summer Efficiency		%
Model Name		%
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue		
Heat Emitter	No	

Flow Temperature	
Flow Temperature Value	

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	Hot Water Cylinder	
Independent Time Control	No	
Cylinder Stat	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day
Pipes insulation		

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 7	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 7	**Prop Type Ref**	
Property			

SAP Rating	51 E	**DER**	14.45	**TER**	
Environmental	90 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.71	**DFEE**	68.15	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	149.97	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	12.07 m	52.55 m²	3.01 m

8.0 Living Area	22.54	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	20.38	15.02	0.00	None	5.36	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	15.98	13.88	0.00	None	2.10	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	52.56	52.56	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	52.56

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NE1	New Glazing	External Wall 1	North East	5.36	0
D SW	New Door	Corridor Wall	South West	2.10	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	100.00	10.00	1000.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Independent	

Summary for Input Data

SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 7	Issued on Date	01/10/2024
Assessment Reference	Apt. 7	Prop Type Ref	
Property			

SAP Rating	51 E	DER	14.45	TER	
Environmental	90 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.71	DFEE	68.15	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	149.97	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.1755	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8764 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8660	0.8491	0.8321	0.7472	0.7302	0.6453	0.6453	0.6283	0.6792	0.7302	0.7641	0.7981	(22b)
Effective ac	0.8750	0.8604	0.8462	0.7791	0.7666	0.7082	0.7082	0.6974	0.7307	0.7666	0.7920	0.8185	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
Corridor Wall	15.9800	2.1000	13.8800	0.1800	2.4984			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			88.9200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.4601			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	17.7840	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	43.2441	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.6736	44.9135	44.1684	40.6689	40.0142	36.9662	36.9662	36.4018	38.1402	40.0142	41.3387	42.7235	(38)
Heat transfer coeff	88.9176	88.1575	87.4125	83.9130	83.2582	80.2103	80.2103	79.6458	81.3843	83.2582	84.5828	85.9675	(39)
Average = Sum(39)m / 12 =												83.9098	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6921	1.6776	1.6634	1.5968	1.5844	1.5264	1.5264	1.5156	1.5487	1.5844	1.6096	1.6359	(40)
HLP (average)												1.5968	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7653	(42)
Hot water usage for mixer showers													
	60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)
Average daily hot water use (litres/day)												85.4593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)										Total = Sum(45)m =		1419.5892	
Distribution loss (46)m = 0.15 x (45)m													
	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
										Total per year (kWh/year) = Sum(64)m =		1682.3892	(64)
12Total per year (kWh/year)												1682	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.9082	59.2387	63.1027	55.8865	54.4518	49.3683	48.9407	50.7113	51.0778	56.5958	59.7412	66.2303	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	86.6878	95.9758	86.6878	89.5774	86.6878	89.5774	86.6878	86.6878	89.5774	86.6878	89.5774	86.6878	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	153.8520	155.4485	151.4253	142.8606	132.0491	121.8878	115.0994	113.5029	117.5261	126.0908	136.9023	147.0636	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	89.9304	88.1528	84.8155	77.6201	73.1879	68.5671	65.7806	68.1604	70.9414	76.0696	82.9738	89.0192	(72)
Total internal gains													
	379.9496	389.0564	372.4080	359.5375	341.4042	329.5117	317.0472	317.8305	327.5242	338.3277	358.9329	372.2500	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)

Solar gains	25.4814	51.8682	93.4500	153.4718	206.2962	219.9335	205.7433	164.0210	113.8703	63.3871	32.0622	20.8094	(83)
Total gains	405.4310	440.9246	465.8580	513.0093	547.7003	549.4453	522.7905	481.8515	441.3945	401.7147	390.9952	393.0594	(84)

---

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.0414	41.3953	41.7481	43.4892	43.8312	45.4967	45.4967	45.8192	44.8404	43.8312	43.1448	42.4498	
alpha	3.7361	3.7597	3.7832	3.8993	3.9221	4.0331	4.0331	4.0546	3.9894	3.9221	3.8763	3.8300	
util living area													
	0.9943	0.9915	0.9855	0.9642	0.9080	0.7732	0.6229	0.6803	0.8829	0.9730	0.9906	0.9950	(86)
MIT	18.9915	19.1721	19.4920	20.0178	20.4764	20.8310	20.9479	20.9262	20.6732	20.1021	19.5160	19.0263	(87)
Th 2	19.5465	19.5569	19.5672	19.6157	19.6248	19.6678	19.6678	19.6758	19.6512	19.6248	19.6063	19.5871	(88)
util rest of house													
	0.9923	0.9884	0.9798	0.9486	0.8636	0.6667	0.4585	0.5199	0.8088	0.9582	0.9866	0.9932	(89)
MIT 2	17.2752	17.5120	17.9256	18.6170	19.1717	19.5693	19.6522	19.6502	19.4198	18.7359	17.9830	17.3449	(90)
Living area fraction										fLA = Living area / (4) =		0.4289	(91)

MIT	18.0114	18.2240	18.5975	19.2178	19.7313	20.1105	20.2079	20.1976	19.9574	19.3219	18.6405	18.0661 (92)
Temperature adjustment												0.0000
adjusted MIT	18.0114	18.2240	18.5975	19.2178	19.7313	20.1105	20.2079	20.1976	19.9574	19.3219	18.6405	18.0661 (93)

---

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9890	0.9842	0.9743	0.9426	0.8678	0.7062	0.5296	0.5886	0.8291	0.9537	0.9825	0.9904	(94)
Useful gains	400.9818	433.9385	453.8951	483.5825	475.2852	388.0013	276.8591	283.6282	365.9614	383.1016	384.1599	389.2807	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1219.1828	1174.6137	1057.4711	865.7998	668.6723	441.9994	289.3939	302.4595	476.7022	726.1662	976.1315	1192.0375	(97)
Space heating kWh	608.7416	497.7338	449.0606	275.1965	143.8800	0.0000	0.0000	0.0000	0.0000	255.2401	426.2196	597.2510	(98a)
Space heating requirement - total per year (kWh/year)												3253.3230	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	608.7416	497.7338	449.0606	275.1965	143.8800	0.0000	0.0000	0.0000	0.0000	255.2401	426.2196	597.2510	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3253.3230	
Space heating per m2											(98c) / (4) =	61.9091	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	608.7416	497.7338	449.0606	275.1965	143.8800	0.0000	0.0000	0.0000	0.0000	255.2401	426.2196	597.2510	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	608.7416	497.7338	449.0606	275.1965	143.8800	0.0000	0.0000	0.0000	0.0000	255.2401	426.2196	597.2510	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.7603	13.4457	12.1064	8.8697	6.8512	5.5975	6.2499	8.1238	10.5520	13.8448	15.6377	17.2261	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3253.3230	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1682.3892	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												135.2650	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5070.9772	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3253.3230	0.1544	502.3375	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1682.3892	0.1411	237.4663	(264)
Space and water heating			739.8039	(265)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	135.2650	0.1443	19.5229	(268)
Total CO2, kg/year			759.3268	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			14.4500	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3253.3230	1.5717	5113.1428	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1682.3892	1.5219	2560.4740	(278)
Space and water heating			7673.6168	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	135.2650	1.5338	207.4740	(282)
Total Primary energy kWh/year			7881.0909	(286)
Dwelling Primary energy Rate (DPER)			149.9700	(287)

Full SAP Calculation Printout

Property Reference	Apt. 7	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 7	**Prop Type Ref**	
Property			

SAP Rating	51 E	**DER**	14.45	**TER**	
Environmental	90 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.71	**DFEE**	68.15	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	149.97	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.1755	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8764	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8660	0.8491	0.8321	0.7472	0.7302	0.6453	0.6453	0.6283	0.6792	0.7302	0.7641	0.7981	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.8750	0.8604	0.8462	0.7791	0.7666	0.7082	0.7082	0.6974	0.7307	0.7666	0.7920	0.8185	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
Corridor Wall	15.9800	2.1000	13.8800	0.1800	2.4984			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			88.9200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.4601			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	17.7840	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	43.2441	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.6736	44.9135	44.1684	40.6689	40.0142	36.9662	36.9662	36.4018	38.1402	40.0142	41.3387	42.7235	(38)
Heat transfer coeff													

	88.9176	88.1575	87.4125	83.9130	83.2582	80.2103	80.2103	79.6458	81.3843	83.2582	84.5828	85.9675 (39)
Average = Sum(39)m / 12 =												83.9098
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.6921	1.6776	1.6634	1.5968	1.5844	1.5264	1.5264	1.5156	1.5487	1.5844	1.6096	1.6359 (40)
HLP (average)												1.5968
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7653 (42)
Hot water usage for mixer showers												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths												
	23.2666	22.9211	22.4345	21.5373	20.8655	20.1205	19.7182	20.2013	20.7275	21.5246	22.4402	23.1879 (42b)
Hot water usage for other uses												
	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084 (42c)
Average daily hot water use (litres/day)												51.3067 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
	55.9750	54.4400	52.7640	50.6775	48.8163	46.8819	46.4796	48.1521	49.8676	51.8541	53.9592	55.8963 (44)
Energy conte	88.6507	77.5219	81.0964	69.3749	65.7161	57.6468	56.2130	59.6224	61.4918	70.3656	76.8748	87.5201 (45)
Energy content (annual)										Total = Sum(45)m =		852.0944
Distribution loss (46)m = 0.15 x (45)m												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss:												
Total storage loss												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	75.3531	65.8936	68.9319	58.9687	55.8587	48.9998	47.7810	50.6791	52.2680	59.8107	65.3436	74.3921 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	75.3531	65.8936	68.9319	58.9687	55.8587	48.9998	47.7810	50.6791	52.2680	59.8107	65.3436	74.3921 (64)
									Total per year (kWh/year) = Sum(64)m =			724.2802 (64)
12Total per year (kWh/year)												724 (64)
Electric shower(s)												
	43.0990	38.4016	41.9330	40.0162	40.7671	38.8878	40.1841	40.7671	40.0162	41.9330	41.1445	43.0990 (64a)
					Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =							490.2486 (64a)
Heat gains from water heating, kWh/month												
	29.6130	26.0738	27.7162	24.7462	24.1564	21.9719	21.9913	22.8615	23.0711	25.4359	26.6220	29.3728 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	86.6878	95.9758	86.6878	89.5774	86.6878	89.5774	86.6878	86.6878	89.5774	86.6878	89.5774	86.6878 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	153.8520	155.4485	151.4253	142.8606	132.0491	121.8878	115.0994	113.5029	117.5261	126.0908	136.9023	147.0636 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118 (71)
Water heating gains (Table 5)												
	39.8024	38.8003	37.2530	34.3697	32.4683	30.5165	29.5582	30.7279	32.0431	34.1881	36.9750	39.4795 (72)
Total internal gains												
	329.8216	339.7039	324.8455	316.2871	300.6846	291.4611	280.8248	280.3980	288.6260	296.4461	312.9342	322.7103 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)

Solar gains	25.4814	51.8682	93.4500	153.4718	206.2962	219.9335	205.7433	164.0210	113.8703	63.3871	32.0622	20.8094 (83)
Total gains	355.3030	391.5721	418.2955	469.7588	506.9807	511.3946	486.5681	444.4189	402.4963	359.8332	344.9964	343.5198 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	41.0414	41.3953	41.7481	43.4892	43.8312	45.4967	45.4967	45.8192	44.8404	43.8312	43.1448	42.4498
alpha	3.7361	3.7597	3.7832	3.8993	3.9221	4.0331	4.0331	4.0546	3.9894	3.9221	3.8763	3.8300
util living area												
	0.9964	0.9943	0.9898	0.9728	0.9251	0.8028	0.6573	0.7182	0.9074	0.9811	0.9939	0.9969 (86)
MIT	18.9003	19.0831	19.4080	19.9467	20.4229	20.8038	20.9368	20.9098	20.6266	20.0305	19.4324	18.9352 (87)
Th 2	19.5465	19.5569	19.5672	19.6157	19.6248	19.6678	19.6678	19.6758	19.6512	19.6248	19.6063	19.5871 (88)
util rest of house												
	0.9950	0.9921	0.9857	0.9604	0.8866	0.7006	0.4892	0.5571	0.8429	0.9702	0.9912	0.9958 (89)
MIT 2	17.6859	17.8752	18.2055	18.7705	19.2272	19.5757	19.6524	19.6503	19.4372	18.8644	18.2588	17.7492 (90)
Living area fraction										fLA = Living area / (4) =		0.4289 (91)
MIT	18.2068	18.3933	18.7213	19.2750	19.7401	20.1025	20.2033	20.1905	19.9474	19.3646	18.7622	18.2579 (92)
Temperature adjustment												0.0000

adjusted MIT	18.2068	18.3933	18.7213	19.2750	19.7401	20.1025	20.2033	20.1905	19.9474	19.3646	18.7622	18.2579	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9932	0.9897	0.9823	0.9563	0.8906	0.7384	0.5622	0.6264	0.8604	0.9673	0.9889	0.9942	(94)
Useful gains	352.8979	387.5234	410.8810	449.2512	451.4922	377.6100	273.5387	278.3822	346.3181	348.0759	341.1511	341.5273	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1236.5621	1189.5369	1068.2925	870.5960	669.4025	441.3555	289.0230	301.8990	475.8845	729.7210	986.4203	1208.5207	(97)
Space heating kWh	657.4462	538.9530	489.1141	303.3683	162.1253	0.0000	0.0000	0.0000	0.0000	283.9439	464.5938	645.0431	(98a)
Space heating requirement - total per year (kWh/year)												3544.5878	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	657.4462	538.9530	489.1141	303.3683	162.1253	0.0000	0.0000	0.0000	0.0000	283.9439	464.5938	645.0431	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3544.5878	
Space heating per m2											(98c) / (4) =	67.4517	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	753.9766	593.5560	605.3084	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6683	0.7558	0.7052	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	503.9098	448.5981	426.8348	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	559.7516	532.6862	485.1640	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	40.2061	62.5615	43.3969	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	10.0515	15.6404	10.8492	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												36.5411	(107)
Energy for space heating												67.4517	(99)
Energy for space cooling												0.6954	(108)
Total												68.1471	(109)
Fabric Energy Efficiency (DFEE)												68.1	(109)

Full SAP Calculation Printout

Property Reference	Apt. 7	Issued on Date	01/10/2024
Assessment Reference	Apt. 7	Prop Type Ref	
Property			

SAP Rating	51 E	DER	14.45	TER	
Environmental	90 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.71	DFEE	68.15	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	149.97	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.1755	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8764 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8660	0.8491	0.8321	0.7472	0.7302	0.6453	0.6453	0.6283	0.6792	0.7302	0.7641	0.7981	(22b)
Effective ac	0.8750	0.8604	0.8462	0.7791	0.7666	0.7082	0.7082	0.6974	0.7307	0.7666	0.7920	0.8185	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
Corridor Wall	15.9800	2.1000	13.8800	0.1800	2.4984			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			88.9200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.4601			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	17.7840	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	43.2441	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.6736	44.9135	44.1684	40.6689	40.0142	36.9662	36.9662	36.4018	38.1402	40.0142	41.3387	42.7235	(38)
Heat transfer coeff	88.9176	88.1575	87.4125	83.9130	83.2582	80.2103	80.2103	79.6458	81.3843	83.2582	84.5828	85.9675	(39)
Average = Sum(39)m / 12 =												83.9098	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6921	1.6776	1.6634	1.5968	1.5844	1.5264	1.5264	1.5156	1.5487	1.5844	1.6096	1.6359	(40)
HLP (average)												1.5968	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7653	(42)
Hot water usage for mixer showers													
	60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)
Average daily hot water use (litres/day)												85.4593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)										Total = Sum(45)m =		1419.5892	
Distribution loss (46)m = 0.15 x (45)m													
	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
										Total per year (kWh/year) = Sum(64)m =		1682.3892	(64)
12Total per year (kWh/year)												1682	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.9082	59.2387	63.1027	55.8865	54.4518	49.3683	48.9407	50.7113	51.0778	56.5958	59.7412	66.2303	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	86.6878	95.9758	86.6878	89.5774	86.6878	89.5774	86.6878	86.6878	89.5774	86.6878	89.5774	86.6878	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	153.8520	155.4485	151.4253	142.8606	132.0491	121.8878	115.0994	113.5029	117.5261	126.0908	136.9023	147.0636	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	89.9304	88.1528	84.8155	77.6201	73.1879	68.5671	65.7806	68.1604	70.9414	76.0696	82.9738	89.0192	(72)
Total internal gains													
	379.9496	389.0564	372.4080	359.5375	341.4042	329.5117	317.0472	317.8305	327.5242	338.3277	358.9329	372.2500	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)

Solar gains	25.4814	51.8682	93.4500	153.4718	206.2962	219.9335	205.7433	164.0210	113.8703	63.3871	32.0622	20.8094	(83)
Total gains	405.4310	440.9246	465.8580	513.0093	547.7003	549.4453	522.7905	481.8515	441.3945	401.7147	390.9952	393.0594	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.0414	41.3953	41.7481	43.4892	43.8312	45.4967	45.4967	45.8192	44.8404	43.8312	43.1448	42.4498	
alpha	3.7361	3.7597	3.7832	3.8993	3.9221	4.0331	4.0331	4.0546	3.9894	3.9221	3.8763	3.8300	
util living area													
	0.9943	0.9915	0.9855	0.9642	0.9080	0.7732	0.6229	0.6803	0.8829	0.9730	0.9906	0.9950	(86)
MIT	18.9915	19.1721	19.4920	20.0178	20.4764	20.8310	20.9479	20.9262	20.6732	20.1021	19.5160	19.0263	(87)
Th 2	19.5465	19.5569	19.5672	19.6157	19.6248	19.6678	19.6678	19.6758	19.6512	19.6248	19.6063	19.5871	(88)
util rest of house													
	0.9923	0.9884	0.9798	0.9486	0.8636	0.6667	0.4585	0.5199	0.8088	0.9582	0.9866	0.9932	(89)
MIT 2	17.2752	17.5120	17.9256	18.6170	19.1717	19.5693	19.6522	19.6502	19.4198	18.7359	17.9830	17.3449	(90)
Living area fraction										fLA = Living area / (4) =		0.4289	(91)

MIT	18.0114	18.2240	18.5975	19.2178	19.7313	20.1105	20.2079	20.1976	19.9574	19.3219	18.6405	18.0661 (92)
Temperature adjustment												0.0000
adjusted MIT	18.0114	18.2240	18.5975	19.2178	19.7313	20.1105	20.2079	20.1976	19.9574	19.3219	18.6405	18.0661 (93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9890	0.9842	0.9743	0.9426	0.8678	0.7062	0.5296	0.5886	0.8291	0.9537	0.9825	0.9904	(94)
Useful gains	400.9818	433.9385	453.8951	483.5825	475.2852	388.0013	276.8591	283.6282	365.9614	383.1016	384.1599	389.2807	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1219.1828	1174.6137	1057.4711	865.7998	668.6723	441.9994	289.3939	302.4595	476.7022	726.1662	976.1315	1192.0375	(97)
Space heating kWh	608.7416	497.7338	449.0606	275.1965	143.8800	0.0000	0.0000	0.0000	0.0000	255.2401	426.2196	597.2510	(98a)
Space heating requirement - total per year (kWh/year)												3253.3230	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	608.7416	497.7338	449.0606	275.1965	143.8800	0.0000	0.0000	0.0000	0.0000	255.2401	426.2196	597.2510	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3253.3230	
Space heating per m2											(98c) / (4) =	61.9091	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	608.7416	497.7338	449.0606	275.1965	143.8800	0.0000	0.0000	0.0000	0.0000	255.2401	426.2196	597.2510	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	608.7416	497.7338	449.0606	275.1965	143.8800	0.0000	0.0000	0.0000	0.0000	255.2401	426.2196	597.2510	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.7603	13.4457	12.1064	8.8697	6.8512	5.5975	6.2499	8.1238	10.5520	13.8448	15.6377	17.2261	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3253.3230	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1682.3892	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												135.2650	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5070.9772	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3253.3230	0.1544	502.3375	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1682.3892	0.1411	237.4663	(264)
Space and water heating			739.8039	(265)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	135.2650	0.1443	19.5229	(268)
Total CO2, kg/year			759.3268	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			14.4500	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3253.3230	1.5717	5113.1428	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1682.3892	1.5219	2560.4740	(278)
Space and water heating			7673.6168	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	135.2650	1.5338	207.4740	(282)
Total Primary energy kWh/year			7881.0909	(286)
Dwelling Primary energy Rate (DPER)			149.9700	(287)

Full SAP Calculation Printout

elmhurst energy

Property Reference	Apt. 7	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 7	**Prop Type Ref**	
Property			

SAP Rating	51 E	**DER**	14.45	**TER**	
Environmental	90 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.71	**DFEE**	68.15	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	149.97	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.1755	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8764 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8660	0.8491	0.8321	0.7472	0.7302	0.6453	0.6453	0.6283	0.6792	0.7302	0.7641	0.7981	(22b)
Effective ac	0.8750	0.8604	0.8462	0.7791	0.7666	0.7082	0.7082	0.6974	0.7307	0.7666	0.7920	0.8185	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
Corridor Wall	15.9800	2.1000	13.8800	0.1800	2.4984			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			88.9200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.4601			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	17.7840	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	43.2441	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.6736	44.9135	44.1684	40.6689	40.0142	36.9662	36.9662	36.4018	38.1402	40.0142	41.3387	42.7235	(38)
Heat transfer coeff	88.9176	88.1575	87.4125	83.9130	83.2582	80.2103	80.2103	79.6458	81.3843	83.2582	84.5828	85.9675	(39)
Average = Sum(39)m / 12 =												83.9098	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6921	1.6776	1.6634	1.5968	1.5844	1.5264	1.5264	1.5156	1.5487	1.5844	1.6096	1.6359	(40)
HLP (average)												1.5968	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7653 (42)
Hot water usage for mixer showers												
	60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092 (42a)
Hot water usage for baths												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses												
	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084 (42c)
Average daily hot water use (litres/day)												85.4593 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)										Total = Sum(45)m =		1419.5892	
Distribution loss (46)m = 0.15 x (45)m													
	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
										Total per year (kWh/year) = Sum(64)m =		1682.3892	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.9082	59.2387	63.1027	55.8865	54.4518	49.3683	48.9407	50.7113	51.0778	56.5958	59.7412	66.2303	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.1482	17.0072	13.8312	10.4711	7.8273	6.6081	7.1403	9.2812	12.4573	15.8174	18.4612	19.6804	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	229.6298	232.0126	226.0080	213.2247	197.0882	181.9221	171.7902	169.4074	175.4120	188.1953	204.3318	219.4979	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	89.9304	88.1528	84.8155	77.6201	73.1879	68.5671	65.7806	68.1604	70.9414	76.0696	82.9738	89.0192	(72)
Total internal gains													
	421.3713	419.8356	407.3176	383.9789	360.7663	339.7603	327.3740	329.5119	341.4736	362.7452	388.4298	410.8604	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Solar gains	25.4814	51.8682	93.4500	153.4718	206.2962	219.9335	205.7433	164.0210	113.8703	63.3871	32.0622	20.8094	(83)
Total gains	446.8528	471.7038	500.7676	537.4507	567.0624	559.6938	533.1173	493.5329	455.3439	426.1323	420.4920	431.6698	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	41.0414	41.3953	41.7481	43.4892	43.8312	45.4967	45.4967	45.8192	44.8404	43.8312	43.1448	42.4498
alpha	3.7361	3.7597	3.7832	3.8993	3.9221	4.0331	4.0331	4.0546	3.9894	3.9221	3.8763	3.8300
util living area												
	0.9921	0.9893	0.9818	0.9588	0.8994	0.7653	0.6135	0.6689	0.8737	0.9675	0.9880	0.9931 (86)
MIT	19.0662	19.2270	19.5527	20.0567	20.5004	20.8377	20.9507	20.9307	20.6886	20.1426	19.5689	19.0968 (87)
Th 2	19.5465	19.5569	19.5672	19.6157	19.6248	19.6678	19.6678	19.6758	19.6512	19.6248	19.6063	19.5871 (88)
util rest of house												
	0.9893	0.9855	0.9747	0.9412	0.8523	0.6579	0.4503	0.5091	0.7964	0.9501	0.9829	0.9907 (89)
MIT 2	17.3700	17.5814	18.0013	18.6636	19.1968	19.5740	19.6531	19.6521	19.4337	18.7843	18.0496	17.4345 (90)
Living area fraction										fLA = Living area / (4) =		0.4289 (91)
MIT	18.0975	18.2872	18.6668	19.2611	19.7559	20.1160	20.2097	20.2005	19.9719	19.3669	18.7013	18.1475 (92)

Temperature adjustment												0.0000	
adjusted MIT	18.0975	18.2872	18.6668	19.2611	19.7559	20.1160	20.2097	20.2005	19.9719	19.3669	18.7013	18.1475	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9853	0.9807	0.9685	0.9354	0.8577	0.6980	0.5209	0.5776	0.8184	0.9457	0.9783	0.9871	(94)
Useful gains	440.2706	462.5796	485.0032	502.7052	486.3905	390.6694	277.7072	285.0811	372.6578	403.0122	411.3471	426.1086	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1226.8437	1180.1862	1063.5259	869.4323	670.7221	442.4414	289.5331	302.6951	477.8835	729.9162	981.2686	1199.0342	(97)
Space heating kWh	585.2104	482.2316	430.4209	264.0435	137.1427	0.0000	0.0000	0.0000	0.0000	243.2166	410.3435	575.0566	(98a)
Space heating requirement - total per year (kWh/year)												3127.6658	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	585.2104	482.2316	430.4209	264.0435	137.1427	0.0000	0.0000	0.0000	0.0000	243.2166	410.3435	575.0566	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3127.6658	
Space heating per m2											(98c) / (4) =	59.5179	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	585.2104	482.2316	430.4209	264.0435	137.1427	0.0000	0.0000	0.0000	0.0000	243.2166	410.3435	575.0566	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	585.2104	482.2316	430.4209	264.0435	137.1427	0.0000	0.0000	0.0000	0.0000	243.2166	410.3435	575.0566	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.7603	13.4457	12.1064	8.8697	6.8512	5.5975	6.2499	8.1238	10.5520	13.8448	15.6377	17.2261	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3127.6658	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1682.3892	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	135.2650	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4945.3200	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3127.6658	16.4900	515.7521	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1682.3892	16.4900	277.4260	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)

Energy for lighting	135.2650	16.4900	22.3052	(250)
Additional standing charges			0.0000	(251)
Total energy cost			815.4833	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):			0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =		3.0095	(257)
SAP value			51.2165	
SAP rating (Section 12)			51	(258)
SAP band			E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3127.6658	0.1544	483.0354	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1682.3892	0.1411	237.4663	(264)
Space and water heating			720.5017	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	135.2650	0.1443	19.5229	(268)
Total CO2, kg/year			740.0246	(272)
CO2 emissions per m2			14.0800	(273)
EI value			89.8346	
EI rating			90	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Ground floor	52.5500 (1b)	x 3.0100 (2b) =	158.1755	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.1755	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8764	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8151	0.7981	0.7811	0.7132	0.6962	0.6283	0.6283	0.6283	0.6283	0.7132	0.7302	0.7641	(22b)
Effective ac	0.8322	0.8185	0.8051	0.7543	0.7424	0.6974	0.6974	0.6974	0.6974	0.7543	0.7666	0.7920	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
Corridor Wall	15.9800	2.1000	13.8800	0.1800	2.4984			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			88.9200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.4601			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K												250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)												17.7840	(36)
Point Thermal bridges											(36a) =	0.0000	
Total fabric heat loss											(33) + (36) + (36a) =	43.2441	(37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	43.4384	42.7235	42.0236	39.3745	38.7498	36.4018	36.4018	36.4018	36.4018	39.3745	40.0142	41.3387	(38)
Heat transfer coeff	86.6825	85.9675	85.2676	82.6185	81.9939	79.6458	79.6458	79.6458	79.6458	82.6185	83.2582	84.5828	(39)
Average = Sum(39)m / 12 =												82.6311	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6495	1.6359	1.6226	1.5722	1.5603	1.5156	1.5156	1.5156	1.5156	1.5722	1.5844	1.6096	(40)
HLP (average)												1.5724	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7653	(42)
Hot water usage for mixer showers	60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)
Average daily hot water use (litres/day)												85.4593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)											Total = Sum(45)m =	1419.5892	
Distribution loss (46)m = 0.15 x (45)m	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
										Total per year (kWh/year) = Sum(64)m =		1682.3892	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	66.9082	59.2387	63.1027	55.8865	54.4518	49.3683	48.9407	50.7113	51.0778	56.5958	59.7412	66.2303	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	19.1482	17.0072	13.8312	10.4711	7.8273	6.6081	7.1403	9.2812	12.4573	15.8174	18.4612	19.6804	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	229.6298	232.0126	226.0080	213.2247	197.0882	181.9221	171.7902	169.4074	175.4120	188.1953	204.3318	219.4979	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)	89.9304	88.1528	84.8155	77.6201	73.1879	68.5671	65.7806	68.1604	70.9414	76.0696	82.9738	89.0192	(72)
Total internal gains	421.3713	419.8356	407.3176	383.9789	360.7663	339.7603	327.3740	329.5119	341.4736	362.7452	388.4298	410.8604	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)

Solar gains	23.5213	48.9866	92.4766	155.5180	205.2217	223.2325	202.4775	158.7974	113.8703	62.4266	30.1191	19.8185	(83)
Total gains	444.8927	468.8222	499.7942	539.4970	565.9880	562.9928	529.8516	488.3093	455.3439	425.1719	418.5489	430.6789	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	42.0997	42.4498	42.7983	44.1705	44.5070	45.8192	45.8192	45.8192	45.8192	44.1705	43.8312	43.1448	

alpha	3.8066	3.8300	3.8532	3.9447	3.9671	4.0546	4.0546	4.0546	4.0546	3.9447	3.9221	3.8763	
util living area	0.9915	0.9888	0.9808	0.9554	0.8889	0.7535	0.6349	0.6842	0.8696	0.9665	0.9869	0.9926	(86)
MIT	19.1830	19.3233	19.6305	20.1140	20.5543	20.8517	20.9427	20.9230	20.7063	20.1665	19.6561	19.1936	(87)
Th 2	19.5772	19.5871	19.5968	19.6338	19.6426	19.6758	19.6758	19.6758	19.6758	19.6338	19.6248	19.6063	(88)
util rest of house	0.9885	0.9847	0.9733	0.9364	0.8372	0.6435	0.4779	0.5275	0.7920	0.9485	0.9812	0.9899	(89)
MIT 2	17.5383	17.7231	18.1188	18.7463	19.2704	19.5923	19.6569	19.6481	19.4710	18.8200	18.1723	17.5703	(90)
Living area fraction									fLA = Living area / (4) =			0.4289	(91)
MIT	18.2437	18.4094	18.7672	19.3330	19.8211	20.1325	20.2084	20.1949	20.0008	19.3975	18.8087	18.2666	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2437	18.4094	18.7672	19.3330	19.8211	20.1325	20.2084	20.1949	20.0008	19.3975	18.8087	18.2666	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9844	0.9799	0.9672	0.9310	0.8452	0.6854	0.5454	0.5943	0.8146	0.9443	0.9765	0.9862	(94)
Useful gains	437.9533	459.3960	483.3934	502.2719	478.3985	385.8645	288.9568	290.2193	370.9409	401.5004	408.6960	424.7478	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1174.0043	1135.5811	1028.9430	845.4331	641.2800	432.6738	303.3235	310.2153	469.9772	718.5755	941.5463	1155.9556	(97)
Space heating kWh	547.6219	454.3964	405.8889	247.0760	121.1838	0.0000	0.0000	0.0000	0.0000	235.9039	383.6522	544.0186	(98a)
Space heating requirement - total per year (kWh/year)												2939.7417	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	547.6219	454.3964	405.8889	247.0760	121.1838	0.0000	0.0000	0.0000	0.0000	235.9039	383.6522	544.0186	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2939.7417	
Space heating per m2											(98c) / (4) =	55.9418	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	547.6219	454.3964	405.8889	247.0760	121.1838	0.0000	0.0000	0.0000	0.0000	235.9039	383.6522	544.0186	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	547.6219	454.3964	405.8889	247.0760	121.1838	0.0000	0.0000	0.0000	0.0000	235.9039	383.6522	544.0186	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.7603	13.4457	12.1064	8.8697	6.8512	5.5975	6.2499	8.1238	10.5520	13.8448	15.6377	17.2261	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2939.7417	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1682.3892	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	135.2650	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4757.3959	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2939.7417	26.0600	766.0967	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1682.3892	26.0600	438.4306	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	135.2650	26.0600	35.2501	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1239.7774	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2939.7417	0.1545	454.0844	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1682.3892	0.1411	237.4663	(264)
Space and water heating			691.5507	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	135.2650	0.1443	19.5229	(268)
Total CO2, kg/year			711.0736	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2939.7417	1.5719	4620.9396	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1682.3892	1.5219	2560.4740	(278)
Space and water heating			7181.4136	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	135.2650	1.5338	207.4740	(282)
Total Primary energy kWh/year			7388.8877	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 7

Current energy efficiency rating: E 51
Current environmental impact rating: B 90

N Solar water heating Not applicable
U Solar photovoltaic panels Not applicable
V2 Wind turbine Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 51
Potential environmental impact rating: B 90

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£1240	£1240	£0
Space heating	£766	£766	£0
Water heating	£438	£438	£0
Lighting	£35	£35	£0
Total cost of fuels	£1240	£1240	£0
Total cost of uses	£1239	£1239	£0
Delivered energy	91 kWh/m²	91 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m²	14 kg/m²	14 kg/m²	0 kg/m²
Primary energy	141 kWh/m²	141 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.1755	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8764 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8660	0.8491	0.8321	0.7472	0.7302	0.6453	0.6453	0.6283	0.6792	0.7302	0.7641	0.7981	(22b)
Effective ac	0.8750	0.8604	0.8462	0.7791	0.7666	0.7082	0.7082	0.6974	0.7307	0.7666	0.7920	0.8185	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
Corridor Wall	15.9800	2.1000	13.8800	0.1800	2.4984			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			88.9200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.4601			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		17.7840 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	43.2441 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.6736	44.9135	44.1684	40.6689	40.0142	36.9662	36.9662	36.4018	38.1402	40.0142	41.3387	42.7235	(38)
Heat transfer coeff	88.9176	88.1575	87.4125	83.9130	83.2582	80.2103	80.2103	79.6458	81.3843	83.2582	84.5828	85.9675	(39)
Average = Sum(39)m / 12 =												83.9098	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6921	1.6776	1.6634	1.5968	1.5844	1.5264	1.5264	1.5156	1.5487	1.5844	1.6096	1.6359	(40)
HLP (average)												1.5968	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.7653 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)

Average daily hot water use (litres/day)		85.4593 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)										Total = Sum(45)m =		1419.5892	
Distribution loss (46)m = 0.15 x (45)m	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)

Water storage loss:		
Store volume		150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):		1.2000 (48)
Temperature factor from Table 2b		0.6000 (49)
Enter (49) or (54) in (55)		0.7200 (55)

Total storage loss

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
											Total per year (kWh/year) = Sum(64)m =	1682.3892	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.9082	59.2387	63.1027	55.8865	54.4518	49.3683	48.9407	50.7113	51.0778	56.5958	59.7412	66.2303	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.1482	17.0072	13.8312	10.4711	7.8273	6.6081	7.1403	9.2812	12.4573	15.8174	18.4612	19.6804	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	229.6298	232.0126	226.0080	213.2247	197.0882	181.9221	171.7902	169.4074	175.4120	188.1953	204.3318	219.4979	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	89.9304	88.1528	84.8155	77.6201	73.1879	68.5671	65.7806	68.1604	70.9414	76.0696	82.9738	89.0192	(72)
Total internal gains													
	421.3713	419.8356	407.3176	383.9789	360.7663	339.7603	327.3740	329.5119	341.4736	362.7452	388.4298	410.8604	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)

Solar gains	25.4814	51.8682	93.4500	153.4718	206.2962	219.9335	205.7433	164.0210	113.8703	63.3871	32.0622	20.8094	(83)
Total gains	446.8528	471.7038	500.7676	537.4507	567.0624	559.6938	533.1173	493.5329	455.3439	426.1323	420.4920	431.6698	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	41.0414	41.3953	41.7481	43.4892	43.8312	45.4967	45.4967	45.8192	44.8404	43.8312	43.1448	42.4498	
alpha	3.7361	3.7597	3.7832	3.8993	3.9221	4.0331	4.0331	4.0546	3.9894	3.9221	3.8763	3.8300	
util living area													
	0.9921	0.9893	0.9818	0.9588	0.8994	0.7653	0.6135	0.6689	0.8737	0.9675	0.9880	0.9931	(86)
MIT	19.0662	19.2270	19.5527	20.0567	20.5004	20.8377	20.9507	20.9307	20.6886	20.1426	19.5689	19.0968	(87)
Th 2	19.5465	19.5569	19.5672	19.6157	19.6248	19.6678	19.6678	19.6758	19.6512	19.6248	19.6063	19.5871	(88)
util rest of house													
	0.9893	0.9855	0.9747	0.9412	0.8523	0.6579	0.4503	0.5091	0.7964	0.9501	0.9829	0.9907	(89)
MIT 2	17.3700	17.5814	18.0013	18.6636	19.1968	19.5740	19.6531	19.6521	19.4337	18.7843	18.0496	17.4345	(90)
Living area fraction										fLA = Living area / (4) =		0.4289	(91)
MIT	18.0975	18.2872	18.6668	19.2611	19.7559	20.1160	20.2097	20.2005	19.9719	19.3669	18.7013	18.1475	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.0975	18.2872	18.6668	19.2611	19.7559	20.1160	20.2097	20.2005	19.9719	19.3669	18.7013	18.1475	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9853	0.9807	0.9685	0.9354	0.8577	0.6980	0.5209	0.5776	0.8184	0.9457	0.9783	0.9871	(94)
Useful gains	440.2706	462.5796	485.0032	502.7052	486.3905	390.6694	277.7072	285.0811	372.6578	403.0122	411.3471	426.1086	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1226.8437	1180.1862	1063.5259	869.4323	670.7221	442.4414	289.5331	302.6951	477.8835	729.9162	981.2686	1199.0342	(97)
Space heating kWh													
	585.2104	482.2316	430.4209	264.0435	137.1427	0.0000	0.0000	0.0000	0.0000	243.2166	410.3435	575.0566	(98a)
Space heating requirement - total per year (kWh/year)												3127.6658	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	585.2104	482.2316	430.4209	264.0435	137.1427	0.0000	0.0000	0.0000	0.0000	243.2166	410.3435	575.0566	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3127.6658	
Space heating per m2											(98c) / (4) =	59.5179	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	585.2104	482.2316	430.4209	264.0435	137.1427	0.0000	0.0000	0.0000	0.0000	243.2166	410.3435	575.0566	(98)

Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	585.2104	482.2316	430.4209	264.0435	137.1427	0.0000	0.0000	0.0000	0.0000	243.2166	410.3435	575.0566	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.7603	13.4457	12.1064	8.8697	6.8512	5.5975	6.2499	8.1238	10.5520	13.8448	15.6377	17.2261	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3127.6658	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1682.3892	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	135.2650	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4945.3200	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3127.6658	16.4900	515.7521	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1682.3892	16.4900	277.4260	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	135.2650	16.4900	22.3052	(250)
Additional standing charges			0.0000	(251)
Total energy cost			815.4833	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.0095	(257)
SAP value		51.2165	
SAP rating (Section 12)		51	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3127.6658	0.1544	483.0354	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1682.3892	0.1411	237.4663	(264)
Space and water heating			720.5017	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	135.2650	0.1443	19.5229	(268)
Total CO2, kg/year			740.0246	(272)
CO2 emissions per m2			14.0800	(273)
EI value			89.8346	
EI rating			90	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.1755	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8764	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8151	0.7981	0.7811	0.7132	0.6962	0.6283	0.6283	0.6283	0.6283	0.7132	0.7302	0.7641	(22b)
Effective ac	0.8322	0.8185	0.8051	0.7543	0.7424	0.6974	0.6974	0.6974	0.6974	0.7543	0.7666	0.7920	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
Corridor Wall	15.9800	2.1000	13.8800	0.1800	2.4984			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			88.9200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.4601			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	17.7840	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	43.2441	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	43.4384	42.7235	42.0236	39.3745	38.7498	36.4018	36.4018	36.4018	36.4018	39.3745	40.0142	41.3387	(38)
Heat transfer coeff	86.6825	85.9675	85.2676	82.6185	81.9939	79.6458	79.6458	79.6458	79.6458	82.6185	83.2582	84.5828	(39)
Average = Sum(39)m / 12 =												82.6311	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.6495	1.6359	1.6226	1.5722	1.5603	1.5156	1.5156	1.5156	1.5156	1.5722	1.5844	1.6096	(40)
HLP (average)												1.5724	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.7653	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)

Average daily hot water use (litres/day)	85.4593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)										Total = Sum(45)m =		1419.5892	
Distribution loss (46)m = 0.15 x (45)m	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													

Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)
Temperature factor from Table 2b 0.6000 (49)
Enter (49) or (54) in (55) 0.7200 (55)
Total storage loss

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)

Total per year (kWh/year) = Sum(64)m = 1682.3892 (64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

66.9082	59.2387	63.1027	55.8865	54.4518	49.3683	48.9407	50.7113	51.0778	56.5958	59.7412	66.2303	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

19.1482	17.0072	13.8312	10.4711	7.8273	6.6081	7.1403	9.2812	12.4573	15.8174	18.4612	19.6804	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

229.6298	232.0126	226.0080	213.2247	197.0882	181.9221	171.7902	169.4074	175.4120	188.1953	204.3318	219.4979	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	(69)
Pumps, fans 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)

Water heating gains (Table 5)

89.9304	88.1528	84.8155	77.6201	73.1879	68.5671	65.7806	68.1604	70.9414	76.0696	82.9738	89.0192	(72)

Total internal gains

421.3713	419.8356	407.3176	383.9789	360.7663	339.7603	327.3740	329.5119	341.4736	362.7452	388.4298	410.8604	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)

Solar gains 23.5213	48.9866	92.4766	155.5180	205.2217	223.2325	202.4775	158.7974	113.8703	62.4266	30.1191	19.8185	(83)
Total gains 444.8927	468.8222	499.7942	539.4970	565.9880	562.9928	529.8516	488.3093	455.3439	425.1719	418.5489	430.6789	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	42.0997	42.4498	42.7983	44.1705	44.5070	45.8192	45.8192	45.8192	45.8192	44.1705	43.8312	43.1448	
alpha	3.8066	3.8300	3.8532	3.9447	3.9671	4.0546	4.0546	4.0546	4.0546	3.9447	3.9221	3.8763	
util living area													
	0.9915	0.9888	0.9808	0.9554	0.8889	0.7535	0.6349	0.6842	0.8696	0.9665	0.9869	0.9926	(86)
MIT	19.1830	19.3233	19.6305	20.1140	20.5543	20.8517	20.9427	20.9230	20.7063	20.1665	19.6561	19.1936	(87)
Th 2	19.5772	19.5871	19.5968	19.6338	19.6426	19.6758	19.6758	19.6758	19.6758	19.6338	19.6248	19.6063	(88)
util rest of house													
	0.9885	0.9847	0.9733	0.9364	0.8372	0.6435	0.4779	0.5275	0.7920	0.9485	0.9812	0.9899	(89)
MIT 2	17.5383	17.7231	18.1188	18.7463	19.2704	19.5923	19.6569	19.6481	19.4710	18.8200	18.1723	17.5703	(90)
Living area fraction									fLA = Living area / (4) =			0.4289	(91)
MIT	18.2437	18.4094	18.7672	19.3330	19.8211	20.1325	20.2084	20.1949	20.0008	19.3975	18.8087	18.2666	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.2437	18.4094	18.7672	19.3330	19.8211	20.1325	20.2084	20.1949	20.0008	19.3975	18.8087	18.2666	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9844	0.9799	0.9672	0.9310	0.8452	0.6854	0.5454	0.5943	0.8146	0.9443	0.9765	0.9862	(94)
Useful gains	437.9533	459.3960	483.3934	502.2719	478.3985	385.8645	288.9568	290.2193	370.9409	401.5004	408.6960	424.7478	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1174.0043	1135.5811	1028.9430	845.4331	641.2800	432.6738	303.3235	310.2153	469.9772	718.5755	941.5463	1155.9556	(97)
Space heating kWh													
	547.6219	454.3964	405.8889	247.0760	121.1838	0.0000	0.0000	0.0000	0.0000	235.9039	383.6522	544.0186	(98a)

Space heating requirement - total per year (kWh/year) 2939.7417
Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000
Space heating kWh

547.6219	454.3964	405.8889	247.0760	121.1838	0.0000	0.0000	0.0000	0.0000	235.9039	383.6522	544.0186	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 2939.7417
Space heating per m2 (98c) / (4) = 55.9418 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	547.6219	454.3964	405.8889	247.0760	121.1838	0.0000	0.0000	0.0000	0.0000	235.9039	383.6522	544.0186	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	547.6219	454.3964	405.8889	247.0760	121.1838	0.0000	0.0000	0.0000	0.0000	235.9039	383.6522	544.0186	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	169.8456	149.8161	158.4004	137.7098	132.3825	118.1063	115.8079	121.1330	123.2475	138.8307	149.3027	167.8065	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	16.7603	13.4457	12.1064	8.8697	6.8512	5.5975	6.2499	8.1238	10.5520	13.8448	15.6377	17.2261	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2939.7417	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1682.3892	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												135.2650	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												4757.3959	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2939.7417	26.0600	766.0967	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1682.3892	26.0600	438.4306	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	135.2650	26.0600	35.2501	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1239.7774	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2939.7417	0.1545	454.0844	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1682.3892	0.1411	237.4663	(264)
Space and water heating			691.5507	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	135.2650	0.1443	19.5229	(268)
Total CO2, kg/year			711.0736	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2939.7417	1.5719	4620.9396	(275)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	1682.3892	1.5219	2560.4740 (278)
Space and water heating			7181.4136 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	135.2650	1.5338	207.4740 (282)
Total Primary energy kWh/year			7388.8877 (286)

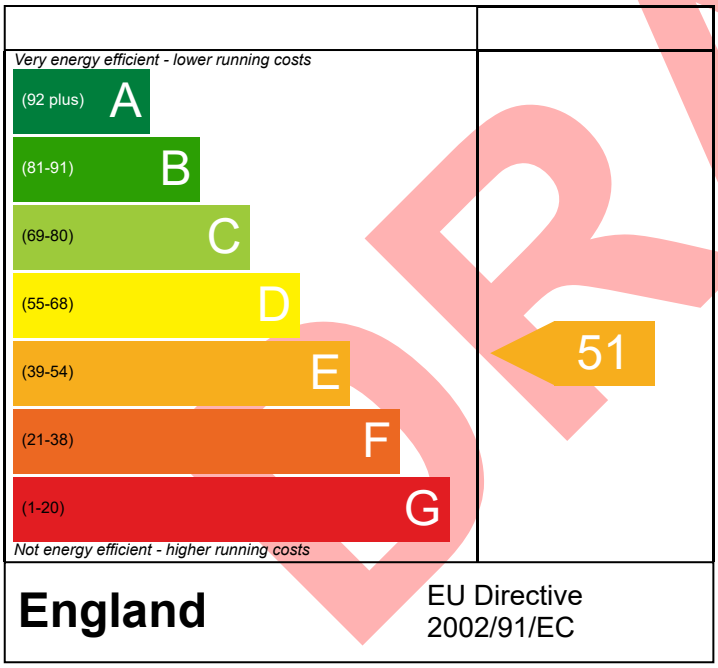
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	52.55 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

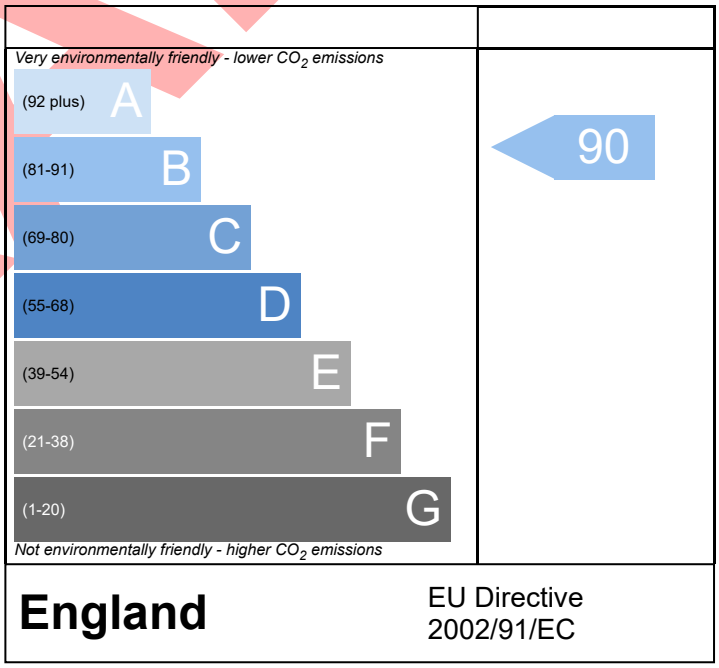
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

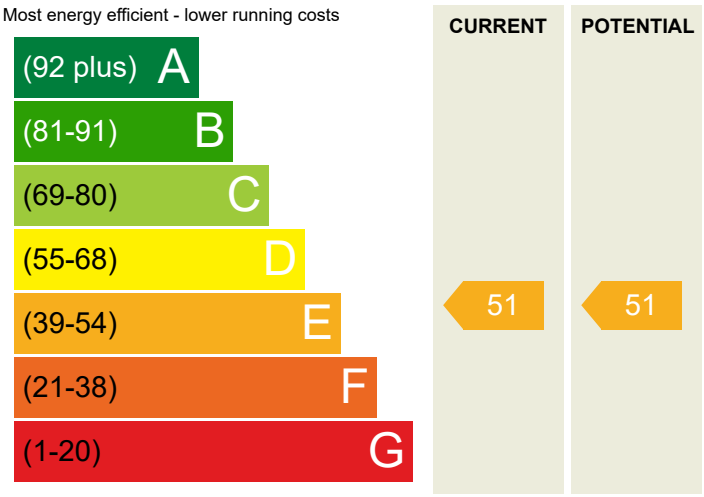
Energy Report

Dwelling Address	
Reference	Apt. 7-Apt. 7
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	53

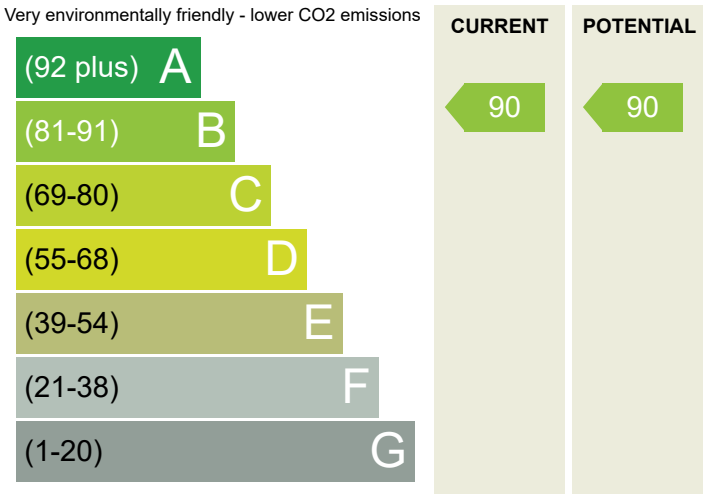
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

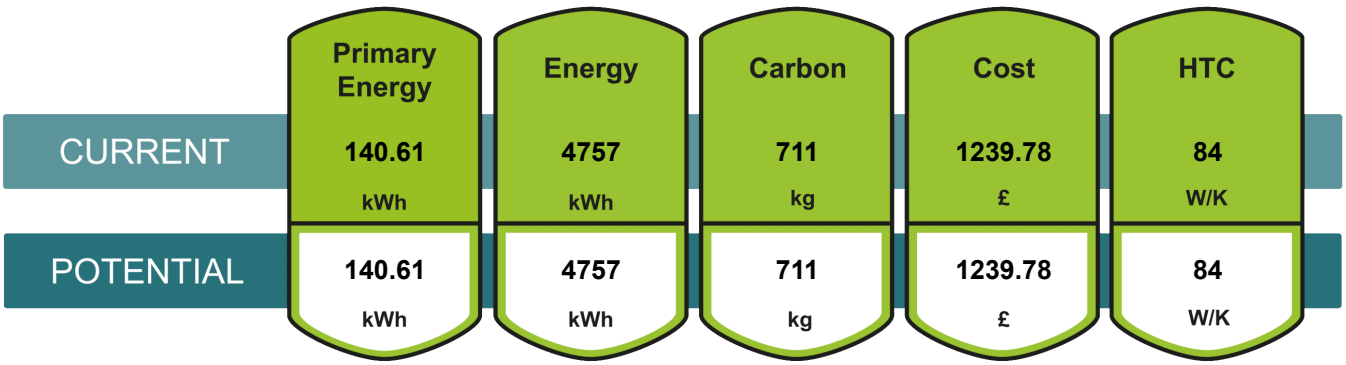
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.24 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£35	£35	You could save £0
Heating	£766	£766	
Hot Water	£438	£438	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1240	£1240	

Estimated energy use and potential savings

Space Heating
2940
kWh per year

Water Heating
1682
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 7	Issued on Date	01/10/2024
Assessment Reference	Apt. 7	Prop Type Ref	Detached Flat
Property			

SAP Rating	51 E	DER	14.45	TER	
Environmental	90 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.71	DFEE	68.15	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	149.97	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Southwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	20.38	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	15.98	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	52.56	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NE1	New Glazing	External Wall 1	North East	5.36
D SW	New Door	Corridor Wall	South West	2.10

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	100.00	10.00	1000.00	10

Comments

Main Heating 1

Fuel Type	SAP table	
Winter Efficiency	Electricity	
Summer Efficiency		%
Model Name		%
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue		
Heat Emitter	No	

Flow Temperature	
Flow Temperature Value	

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	Hot Water Cylinder	
Independent Time Control	No	
Cylinder Stat	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day
Pipes insulation		

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 8	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 8	**Prop Type Ref**	
Property			

SAP Rating	46 E	**DER**	14.26	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.91	**DFEE**	71.29	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	147.56	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	17.98 m	68.11 m²	3.01 m

8.0 Living Area	23.24	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	48.22	38.78	0.00	None	9.44	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	5.89	3.79	0.00	None	2.10	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	68.11	68.11	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	68.11

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NE1	New Glazing	External Wall 1	North East	5.36	0
D SW	New Door	Corridor Wall	South West	2.10	0
W SE1	New Glazing	External Wall 1	South East	4.08	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	100.00	10.00	1000.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None
28.0 Water Heating	

Summary for Input Data

Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 8	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 8	**Prop Type Ref**	
Property			

SAP Rating	46 E	**DER**	14.26	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.91	**DFEE**	71.29	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	147.56	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8476 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9185	0.9005	0.8825	0.7925	0.7745	0.6844	0.6844	0.6664	0.7204	0.7745	0.8105	0.8465	(22b)
Effective ac	0.9219	0.9055	0.8894	0.8140	0.7999	0.7342	0.7342	0.7220	0.7595	0.7999	0.8284	0.8583	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
Corridor Wall	5.8900	2.1000	3.7900	0.1800	0.6822			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			122.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		38.6690			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	24.4440	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	63.1130	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	62.3670	61.2587	60.1724	55.0701	54.1155	49.6715	49.6715	48.8485	51.3832	54.1155	56.0467	58.0656	(38)
Heat transfer coeff	125.4799	124.3717	123.2854	118.1830	117.2284	112.7844	112.7844	111.9615	114.4962	117.2284	119.1596	121.1786	(39)
Average = Sum(39)m / 12 =												118.1785	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8423	1.8260	1.8101	1.7352	1.7212	1.6559	1.6559	1.6438	1.6810	1.7212	1.7495	1.7792	(40)
HLP (average)												1.7351	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1994	(42)
Hot water usage for mixer showers													
	68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												97.0684	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)										Total = Sum(45)m =		1612.4316	
Distribution loss (46)m = 0.15 x (45)m													
	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
										Total per year (kWh/year) = Sum(64)m =		1875.2316	(64)
12Total per year (kWh/year)												1875	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	73.5717	65.0950	69.2492	61.1309	59.4231	53.7273	53.1634	55.1745	55.6690	61.8584	65.5093	72.8016	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	101.6813	112.5757	101.6813	105.0707	101.6813	105.0707	101.6813	101.6813	105.0707	101.6813	105.0707	101.6813	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	192.8463	194.8475	189.8047	179.0691	165.5174	152.7807	144.2718	142.2707	147.3135	158.0490	171.6007	184.3374	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	98.8867	96.8675	93.0769	84.9041	79.8697	74.6213	71.4562	74.1593	77.3181	83.1430	90.9851	97.8517	(72)
Total internal gains													
	449.4050	460.2814	440.5535	425.0346	403.0591	388.4634	373.4000	374.1020	385.6930	398.8640	423.6472	439.8611	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	4.0800	36.7938	0.7600	0.8000	0.7700	63.2517	(77)

Solar gains	88.7331	159.6092	240.8659	336.1272	410.8855	423.0434	401.5629	343.4769	273.4906	182.4638	107.8232	74.9397	(83)
Total gains	538.1381	619.8906	681.4194	761.1618	813.9446	811.5068	774.9629	717.5789	659.1835	581.3278	531.4704	514.8008	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6942	38.0301	38.3651	40.0215	40.3474	41.9372	41.9372	42.2454	41.3102	40.3474	39.6935	39.0321	
alpha	3.5129	3.5353	3.5577	3.6681	3.6898	3.7958	3.7958	3.8164	3.7540	3.6898	3.6462	3.6021	
util living area													
	0.9937	0.9890	0.9797	0.9511	0.8845	0.7428	0.5923	0.6461	0.8546	0.9649	0.9892	0.9947	(86)
MIT	18.8186	19.0531	19.4264	19.9958	20.4721	20.8285	20.9463	20.9258	20.6747	20.0616	19.3958	18.8484	(87)
Th 2	19.4405	19.4518	19.4629	19.5157	19.5257	19.5726	19.5726	19.5813	19.5544	19.5257	19.5056	19.4846	(88)
util rest of house													
	0.9914	0.9850	0.9718	0.9303	0.8311	0.6278	0.4222	0.4785	0.7678	0.9457	0.9845	0.9928	(89)
MIT 2	16.9902	17.2954	17.7756	18.5184	19.0850	19.4776	19.5577	19.5576	19.3364	18.6174	17.7667	17.0547	(90)

Living area fraction										fLA = Living area / (4) =		0.3412	(91)
MIT	17.6141	17.8951	18.3389	19.0225	19.5583	19.9386	20.0315	20.0244	19.7931	19.1102	18.3226	17.6667	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.6141	17.8951	18.3389	19.0225	19.5583	19.9386	20.0315	20.0244	19.7931	19.1102	18.3226	17.6667	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9873	0.9789	0.9634	0.9212	0.8326	0.6609	0.4808	0.5357	0.7852	0.9382	0.9789	0.9892	(94)
Useful gains	531.2779	606.8133	656.4705	701.1736	677.6631	536.3479	372.6183	384.4005	517.5923	545.4058	520.2424	509.2502	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1670.6466	1616.2284	1459.5584	1196.3095	921.2164	602.1076	387.0208	405.7964	651.8342	997.6315	1337.2756	1631.8786	(97)
Space heating kWh	847.6903	678.3269	597.4974	356.4978	181.2037	0.0000	0.0000	0.0000	0.0000	336.4559	588.2639	835.2355	(98a)
Space heating requirement - total per year (kWh/year)												4421.1715	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	847.6903	678.3269	597.4974	356.4978	181.2037	0.0000	0.0000	0.0000	0.0000	336.4559	588.2639	835.2355	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4421.1715	
Space heating per m2											(98c) / (4) =	64.9122	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	847.6903	678.3269	597.4974	356.4978	181.2037	0.0000	0.0000	0.0000	0.0000	336.4559	588.2639	835.2355	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	847.6903	678.3269	597.4974	356.4978	181.2037	0.0000	0.0000	0.0000	0.0000	336.4559	588.2639	835.2355	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.6591	15.7713	14.2003	10.4037	8.0362	6.5656	7.3308	9.5289	12.3771	16.2394	18.3424	20.2055	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4421.1715	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1875.2316	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	158.6605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6455.0636	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4421.1715	0.1547	683.7503	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1875.2316	0.1412	264.7727	(264)

Space and water heating			948.5229	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	158.6605	0.1443	22.8996	(268)
Total CO2, kg/year			971.4226	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			14.2600	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4421.1715	1.5726	6952.6048	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1875.2316	1.5221	2854.2920	(278)
Space and water heating			9806.8969	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	158.6605	1.5338	243.3587	(282)
Total Primary energy kWh/year			10050.2556	(286)
Dwelling Primary energy Rate (DPER)			147.5600	(287)

Full SAP Calculation Printout

Property Reference	Apt. 8	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 8	**Prop Type Ref**	
Property			

SAP Rating	46 E	**DER**	14.26	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.91	**DFEE**	71.29	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	147.56	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8476 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9185	0.9005	0.8825	0.7925	0.7745	0.6844	0.6844	0.6664	0.7204	0.7745	0.8105	0.8465	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9219	0.9055	0.8894	0.8140	0.7999	0.7342	0.7342	0.7220	0.7595	0.7999	0.8284	0.8583	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
Corridor Wall	5.8900	2.1000	3.7900	0.1800	0.6822			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			122.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		38.6690			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	24.4440	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	63.1130	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	62.3670	61.2587	60.1724	55.0701	54.1155	49.6715	49.6715	48.8485	51.3832	54.1155	56.0467	58.0656	(38)
Heat transfer coeff													

	125.4799	124.3717	123.2854	118.1830	117.2284	112.7844	112.7844	111.9615	114.4962	117.2284	119.1596	121.1786	(39)
Average = Sum(39)m / 12 =												118.1785	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8423	1.8260	1.8101	1.7352	1.7212	1.6559	1.6559	1.6438	1.6810	1.7212	1.7495	1.7792	(40)
HLP (average)												1.7351	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1994	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	26.3965	26.0045	25.4524	24.4345	23.6724	22.8272	22.3707	22.9189	23.5158	24.4201	25.4590	26.3073	(42b)
Hot water usage for other uses													
	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												58.2499	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	63.5503	61.8073	59.9042	57.5352	55.4220	53.2258	52.7693	54.6686	56.6165	58.8719	61.2618	63.4611	(44)
Energy conte	100.6482	88.0127	92.0705	78.7629	74.6087	65.4473	63.8199	67.6911	69.8138	79.8886	87.2786	99.3648	(45)
Energy content (annual)										Total = Sum(45)m =		967.4070	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	85.5510	74.8108	78.2599	66.9484	63.4174	55.6302	54.2469	57.5374	59.3417	67.9053	74.1868	84.4600	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	85.5510	74.8108	78.2599	66.9484	63.4174	55.6302	54.2469	57.5374	59.3417	67.9053	74.1868	84.4600	(64)
										Total per year (kWh/year) = Sum(64)m =		822.2959	(64)
12Total per year (kWh/year)												822	(64)
Electric shower(s)													
	48.9277	43.5950	47.6041	45.4280	46.2804	44.1470	45.6186	46.2804	45.4280	47.6041	46.7089	48.9277	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		556.5498	(64a)
Heat gains from water heating, kWh/month													
	33.6197	29.6015	31.4660	28.0941	27.4244	24.9443	24.9664	25.9545	26.1924	28.8773	30.2239	33.3469	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	101.6813	112.5757	101.6813	105.0707	101.6813	105.0707	101.6813	101.6813	105.0707	101.6813	105.0707	101.6813	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	192.8463	194.8475	189.8047	179.0691	165.5174	152.7807	144.2718	142.2707	147.3135	158.0490	171.6007	184.3374	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	45.1877	44.0498	42.2930	39.0196	36.8608	34.6449	33.5570	34.8850	36.3784	38.8136	41.9777	44.8212	(72)
Total internal gains													
	395.7060	407.4637	389.7696	379.1500	360.0502	348.4870	335.5008	334.8277	344.7532	354.5346	374.6398	386.8306	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	4.0800	36.7938	0.7600	0.8000	0.7700	63.2517	(77)

Solar gains	88.7331	159.6092	240.8659	336.1272	410.8855	423.0434	401.5629	343.4769	273.4906	182.4638	107.8232	74.9397	(83)
Total gains	484.4391	567.0729	630.6356	715.2773	770.9357	771.5304	737.0637	678.3046	618.2438	536.9985	482.4630	461.7702	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6942	38.0301	38.3651	40.0215	40.3474	41.9372	41.9372	42.2454	41.3102	40.3474	39.6935	39.0321	
alpha	3.5129	3.5353	3.5577	3.6681	3.6898	3.7958	3.7958	3.8164	3.7540	3.6898	3.6462	3.6021	
util living area													
	0.9955	0.9917	0.9840	0.9590	0.8985	0.7643	0.6156	0.6723	0.8742	0.9722	0.9921	0.9963	(86)
MIT	18.7453	18.9820	19.3602	19.9417	20.4333	20.8096	20.9388	20.9148	20.6418	20.0063	19.3289	18.7750	(87)
Th 2	19.4405	19.4518	19.4629	19.5157	19.5257	19.5726	19.5726	19.5813	19.5544	19.5257	19.5056	19.4846	(88)
util rest of house													
	0.9939	0.9886	0.9775	0.9410	0.8493	0.6514	0.4421	0.5028	0.7936	0.9566	0.9886	0.9950	(89)
MIT 2	17.4582	17.7012	18.0837	18.6886	19.1513	19.4886	19.5590	19.5595	19.3623	18.7663	18.0848	17.5180	(90)
Living area fraction										fLA = Living area / (4) =		0.3412	(91)
MIT	17.8973	18.1383	18.5193	19.1162	19.5887	19.9394	20.0298	20.0219	19.7989	19.1894	18.5093	17.9469	(92)

Temperature adjustment												0.0000	
adjusted MIT	17.8973	18.1383	18.5193	19.1162	19.5887	19.9394	20.0298	20.0219	19.7989	19.1894	18.5093	17.9469	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9914	0.9847	0.9719	0.9346	0.8519	0.6843	0.5022	0.5610	0.8104	0.9516	0.9851	0.9929	(94)
Useful gains	480.2624	558.4196	612.9344	668.4915	656.7598	527.9840	370.1656	380.5211	501.0251	510.9978	475.2830	458.4779	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1706.1923	1646.4658	1481.8026	1207.3816	924.7829	602.1983	386.8300	405.5155	652.5043	1006.9236	1359.5288	1665.8286	(97)
Space heating kWh													
	912.0918	731.1670	646.4380	388.0009	199.4092	0.0000	0.0000	0.0000	0.0000	368.9688	636.6570	898.2689	(98a)
Space heating requirement - total per year (kWh/year)												4781.0015	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	912.0918	731.1670	646.4380	388.0009	199.4092	0.0000	0.0000	0.0000	0.0000	368.9688	636.6570	898.2689	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4781.0015	
Space heating per m2											(98c) / (4) =	70.1953	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	1060.1738	834.6049	850.9073	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7021	0.7855	0.7429	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	744.3913	655.6147	632.1416	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	860.4221	822.2437	755.5747	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	83.5422	123.9720	91.8342	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	20.8855	30.9930	22.9586	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												74.8371	(107)
Energy for space heating												70.1953	(99)
Energy for space cooling												1.0988	(108)
Total												71.2941	(109)
Fabric Energy Efficiency (DFEE)												71.3	(109)

Full SAP Calculation Printout

Property Reference	Apt. 8	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 8	**Prop Type Ref**	
Property			

SAP Rating	46 E	**DER**	14.26	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.91	**DFEE**	71.29	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	147.56	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8476 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9185	0.9005	0.8825	0.7925	0.7745	0.6844	0.6844	0.6664	0.7204	0.7745	0.8105	0.8465	(22b)
Effective ac	0.9219	0.9055	0.8894	0.8140	0.7999	0.7342	0.7342	0.7220	0.7595	0.7999	0.8284	0.8583	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
Corridor Wall	5.8900	2.1000	3.7900	0.1800	0.6822			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			122.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		38.6690			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	24.4440	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	63.1130	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	62.3670	61.2587	60.1724	55.0701	54.1155	49.6715	49.6715	48.8485	51.3832	54.1155	56.0467	58.0656	(38)
Heat transfer coeff	125.4799	124.3717	123.2854	118.1830	117.2284	112.7844	112.7844	111.9615	114.4962	117.2284	119.1596	121.1786	(39)
Average = Sum(39)m / 12 =												118.1785	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8423	1.8260	1.8101	1.7352	1.7212	1.6559	1.6559	1.6438	1.6810	1.7212	1.7495	1.7792	(40)
HLP (average)												1.7351	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1994	(42)
Hot water usage for mixer showers													
	68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												97.0684	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)										Total = Sum(45)m =		1612.4316	
Distribution loss (46)m = 0.15 x (45)m													
	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
										Total per year (kWh/year) = Sum(64)m =		1875.2316	(64)
12Total per year (kWh/year)												1875	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	73.5717	65.0950	69.2492	61.1309	59.4231	53.7273	53.1634	55.1745	55.6690	61.8584	65.5093	72.8016	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	101.6813	112.5757	101.6813	105.0707	101.6813	105.0707	101.6813	101.6813	105.0707	101.6813	105.0707	101.6813	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	192.8463	194.8475	189.8047	179.0691	165.5174	152.7807	144.2718	142.2707	147.3135	158.0490	171.6007	184.3374	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	98.8867	96.8675	93.0769	84.9041	79.8697	74.6213	71.4562	74.1593	77.3181	83.1430	90.9851	97.8517	(72)
Total internal gains													
	449.4050	460.2814	440.5535	425.0346	403.0591	388.4634	373.4000	374.1020	385.6930	398.8640	423.6472	439.8611	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	4.0800	36.7938	0.7600	0.8000	0.7700	63.2517	(77)

Solar gains	88.7331	159.6092	240.8659	336.1272	410.8855	423.0434	401.5629	343.4769	273.4906	182.4638	107.8232	74.9397	(83)
Total gains	538.1381	619.8906	681.4194	761.1618	813.9446	811.5068	774.9629	717.5789	659.1835	581.3278	531.4704	514.8008	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6942	38.0301	38.3651	40.0215	40.3474	41.9372	41.9372	42.2454	41.3102	40.3474	39.6935	39.0321	
alpha	3.5129	3.5353	3.5577	3.6681	3.6898	3.7958	3.7958	3.8164	3.7540	3.6898	3.6462	3.6021	
util living area													
	0.9937	0.9890	0.9797	0.9511	0.8845	0.7428	0.5923	0.6461	0.8546	0.9649	0.9892	0.9947	(86)
MIT	18.8186	19.0531	19.4264	19.9958	20.4721	20.8285	20.9463	20.9258	20.6747	20.0616	19.3958	18.8484	(87)
Th 2	19.4405	19.4518	19.4629	19.5157	19.5257	19.5726	19.5726	19.5813	19.5544	19.5257	19.5056	19.4846	(88)
util rest of house													
	0.9914	0.9850	0.9718	0.9303	0.8311	0.6278	0.4222	0.4785	0.7678	0.9457	0.9845	0.9928	(89)
MIT 2	16.9902	17.2954	17.7756	18.5184	19.0850	19.4776	19.5577	19.5576	19.3364	18.6174	17.7667	17.0547	(90)

Living area fraction										fLA = Living area / (4) =		0.3412	(91)
MIT	17.6141	17.8951	18.3389	19.0225	19.5583	19.9386	20.0315	20.0244	19.7931	19.1102	18.3226	17.6667	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.6141	17.8951	18.3389	19.0225	19.5583	19.9386	20.0315	20.0244	19.7931	19.1102	18.3226	17.6667	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9873	0.9789	0.9634	0.9212	0.8326	0.6609	0.4808	0.5357	0.7852	0.9382	0.9789	0.9892	(94)
Useful gains	531.2779	606.8133	656.4705	701.1736	677.6631	536.3479	372.6183	384.4005	517.5923	545.4058	520.2424	509.2502	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1670.6466	1616.2284	1459.5584	1196.3095	921.2164	602.1076	387.0208	405.7964	651.8342	997.6315	1337.2756	1631.8786	(97)
Space heating kWh	847.6903	678.3269	597.4974	356.4978	181.2037	0.0000	0.0000	0.0000	0.0000	336.4559	588.2639	835.2355	(98a)
Space heating requirement - total per year (kWh/year)												4421.1715	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	847.6903	678.3269	597.4974	356.4978	181.2037	0.0000	0.0000	0.0000	0.0000	336.4559	588.2639	835.2355	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4421.1715	
Space heating per m2											(98c) / (4) =	64.9122	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	847.6903	678.3269	597.4974	356.4978	181.2037	0.0000	0.0000	0.0000	0.0000	336.4559	588.2639	835.2355	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	847.6903	678.3269	597.4974	356.4978	181.2037	0.0000	0.0000	0.0000	0.0000	336.4559	588.2639	835.2355	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.6591	15.7713	14.2003	10.4037	8.0362	6.5656	7.3308	9.5289	12.3771	16.2394	18.3424	20.2055	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4421.1715	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1875.2316	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	158.6605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6455.0636	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4421.1715	0.1547	683.7503	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1875.2316	0.1412	264.7727	(264)

Space and water heating			948.5229	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	158.6605	0.1443	22.8996	(268)
Total CO2, kg/year			971.4226	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			14.2600	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4421.1715	1.5726	6952.6048	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1875.2316	1.5221	2854.2920	(278)
Space and water heating			9806.8969	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	158.6605	1.5338	243.3587	(282)
Total Primary energy kWh/year			10050.2556	(286)
Dwelling Primary energy Rate (DPER)			147.5600	(287)

Full SAP Calculation Printout

elmhurst energy

Property Reference	Apt. 8	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 8	**Prop Type Ref**	
Property			

SAP Rating	46 E	**DER**	14.26	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.91	**DFEE**	71.29	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	147.56	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8476 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9185	0.9005	0.8825	0.7925	0.7745	0.6844	0.6844	0.6664	0.7204	0.7745	0.8105	0.8465	(22b)
Effective ac	0.9219	0.9055	0.8894	0.8140	0.7999	0.7342	0.7342	0.7220	0.7595	0.7999	0.8284	0.8583	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
Corridor Wall	5.8900	2.1000	3.7900	0.1800	0.6822			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			122.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		38.6690			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	24.4440	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 63.1130	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	62.3670	61.2587	60.1724	55.0701	54.1155	49.6715	49.6715	48.8485	51.3832	54.1155	56.0467	58.0656	(38)
Heat transfer coeff	125.4799	124.3717	123.2854	118.1830	117.2284	112.7844	112.7844	111.9615	114.4962	117.2284	119.1596	121.1786	(39)
Average = Sum(39)m / 12 =												118.1785	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8423	1.8260	1.8101	1.7352	1.7212	1.6559	1.6559	1.6438	1.6810	1.7212	1.7495	1.7792	(40)
HLP (average)												1.7351	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1994	(42)
Hot water usage for mixer showers													
	68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												97.0684	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)										Total = Sum(45)m =		1612.4316	
Distribution loss (46)m = 0.15 x (45)m													
	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
										Total per year (kWh/year) = Sum(64)m =		1875.2316	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	73.5717	65.0950	69.2492	61.1309	59.4231	53.7273	53.1634	55.1745	55.6690	61.8584	65.5093	72.8016	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.4600	19.9488	16.2235	12.2822	9.1811	7.7511	8.3753	10.8865	14.6119	18.5531	21.6542	23.0843	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	287.8303	290.8171	283.2905	267.2673	247.0409	228.0309	215.3311	212.3443	219.8709	235.8941	256.1205	275.1305	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	98.8867	96.8675	93.0769	84.9041	79.8697	74.6213	71.4562	74.1593	77.3181	83.1430	90.9851	97.8517	(72)
Total internal gains													
	503.5603	502.0167	486.9741	458.8369	430.4750	404.7865	389.5458	391.7734	406.1841	431.9735	463.1431	490.4497	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	4.0800	36.7938	0.7600	0.8000	0.7700	63.2517	(77)

Solar gains	88.7331	159.6092	240.8659	336.1272	410.8855	423.0434	401.5629	343.4769	273.4906	182.4638	107.8232	74.9397	(83)
Total gains	592.2934	661.6259	727.8400	794.9641	841.3605	827.8299	791.1087	735.2503	679.6747	614.4373	570.9662	565.3893	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6942	38.0301	38.3651	40.0215	40.3474	41.9372	41.9372	42.2454	41.3102	40.3474	39.6935	39.0321	
alpha	3.5129	3.5353	3.5577	3.6681	3.6898	3.7958	3.7958	3.8164	3.7540	3.6898	3.6462	3.6021	
util living area													
	0.9915	0.9866	0.9753	0.9449	0.8752	0.7341	0.5827	0.6347	0.8446	0.9588	0.9864	0.9928	(86)
MIT	18.8920	19.1087	19.4858	20.0345	20.4956	20.8356	20.9492	20.9302	20.6901	20.1018	19.4489	18.9180	(87)
Th 2	19.4405	19.4518	19.4629	19.5157	19.5257	19.5726	19.5726	19.5813	19.5544	19.5257	19.5056	19.4846	(88)
util rest of house													
	0.9885	0.9817	0.9659	0.9220	0.8194	0.6185	0.4142	0.4682	0.7550	0.9369	0.9806	0.9903	(89)
MIT 2	17.0833	17.3654	17.8492	18.5637	19.1087	19.4824	19.5586	19.5593	19.3494	18.6647	17.8335	17.1431	(90)
Living area fraction										fLA = Living area / (4) =		0.3412	(91)

MIT	17.7004	17.9602	18.4076	19.0656	19.5819	19.9441	20.0331	20.0270	19.8068	19.1551	18.3847	17.7487	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.7004	17.9602	18.4076	19.0656	19.5819	19.9441	20.0331	20.0270	19.8068	19.1551	18.3847	17.7487	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9833	0.9748	0.9567	0.9130	0.8220	0.6522	0.4723	0.5251	0.7738	0.9294	0.9742	0.9858	(94)
Useful gains	582.3859	644.9576	696.3090	725.7654	691.5847	539.8699	373.6335	386.0756	525.9454	571.0419	556.2318	557.3628	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1681.4873	1624.3242	1468.0340	1201.3975	923.9842	602.7318	387.2007	406.0887	653.4123	1002.8956	1344.6814	1641.8131	(97)
Space heating kWh													
	817.7315	658.1344	574.1634	342.4551	172.9053	0.0000	0.0000	0.0000	0.0000	321.2992	567.6837	806.8310	(98a)
Space heating requirement - total per year (kWh/year)												4261.2035	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	817.7315	658.1344	574.1634	342.4551	172.9053	0.0000	0.0000	0.0000	0.0000	321.2992	567.6837	806.8310	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4261.2035	
Space heating per m2											(98c) / (4) =	62.5636	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	817.7315	658.1344	574.1634	342.4551	172.9053	0.0000	0.0000	0.0000	0.0000	321.2992	567.6837	806.8310	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	817.7315	658.1344	574.1634	342.4551	172.9053	0.0000	0.0000	0.0000	0.0000	321.2992	567.6837	806.8310	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.6591	15.7713	14.2003	10.4037	8.0362	6.5656	7.3308	9.5289	12.3771	16.2394	18.3424	20.2055	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4261.2035	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1875.2316	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	158.6605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6295.0955	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4261.2035	16.4900	702.6725	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1875.2316	16.4900	309.2257	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (249)
Energy for lighting	158.6605	16.4900	26.1631 (250)
Additional standing charges			0.0000 (251)
Total energy cost			1038.0613 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.3039 (257)
SAP value		46.4441
SAP rating (Section 12)		46 (258)
SAP band		E

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4261.2035	0.1547	659.1637	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1875.2316	0.1412	264.7727	(264)
Space and water heating			923.9364	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	158.6605	0.1443	22.8996	(268)
Total CO2, kg/year			946.8360	(272)
CO2 emissions per m2			13.9000	(273)
EI value			88.7830	
EI rating			89	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8476	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8645	0.8465	0.8285	0.7564	0.7384	0.6664	0.6664	0.6664	0.6664	0.7564	0.7745	0.8105	(22b)
Effective ac	0.8737	0.8583	0.8432	0.7861	0.7726	0.7220	0.7220	0.7220	0.7220	0.7861	0.7999	0.8284	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
Corridor Wall	5.8900	2.1000	3.7900	0.1800	0.6822			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			122.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		38.6690			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area) 24.4440 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 63.1130 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	59.1081	58.0656	57.0452	53.1828	52.2720	48.8485	48.8485	48.8485	48.8485	53.1828	54.1155	56.0467	(38)
Heat transfer coeff	122.2210	121.1786	120.1581	116.2957	115.3850	111.9615	111.9615	111.9615	111.9615	116.2957	117.2284	119.1596	(39)
Average = Sum(39)m / 12 =												116.3140	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7945	1.7792	1.7642	1.7075	1.6941	1.6438	1.6438	1.6438	1.6438	1.7075	1.7212	1.7495	(40)
HLP (average)												1.7077	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.1994 (42)

Hot water usage for mixer showers	68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												97.0684	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)										Total = Sum(45)m =		1612.4316	
Distribution loss (46)m = 0.15 x (45)m	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)

Water storage loss:
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)
Temperature factor from Table 2b 0.6000 (49)
Enter (49) or (54) in (55) 0.7200 (55)

Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
									Total per year (kWh/year) = Sum(64)m =			1875.2316	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	73.5717	65.0950	69.2492	61.1309	59.4231	53.7273	53.1634	55.1745	55.6690	61.8584	65.5093	72.8016	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.4600	19.9488	16.2235	12.2822	9.1811	7.7511	8.3753	10.8865	14.6119	18.5531	21.6542	23.0843	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	287.8303	290.8171	283.2905	267.2673	247.0409	228.0309	215.3311	212.3443	219.8709	235.8941	256.1205	275.1305	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)	98.8867	96.8675	93.0769	84.9041	79.8697	74.6213	71.4562	74.1593	77.3181	83.1430	90.9851	97.8517	(72)
Total internal gains	503.5603	502.0167	486.9741	458.8369	430.4750	404.7865	389.5458	391.7734	406.1841	431.9735	463.1431	490.4497	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Southeast	4.0800	33.9635	0.7600	0.8000	0.7700	58.3862	(77)

Solar gains	81.9075	150.7420	238.3569	340.6089	408.7455	429.3891	395.1889	332.5381	273.4906	179.6992	101.2884	71.3711	(83)
Total gains	585.4678	652.7587	725.3310	799.4458	839.2205	834.1756	784.7347	724.3115	679.6747	611.6727	564.4315	561.8208	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.6992	39.0321	39.3636	40.6710	40.9920	42.2454	42.2454	42.2454	42.2454	40.6710	40.3474	39.6935	
alpha	3.5799	3.6021	3.6242	3.7114	3.7328	3.8164	3.8164	3.8164	3.8164	3.7114	3.6898	3.6462	
util living area													
	0.9912	0.9862	0.9741	0.9404	0.8636	0.7214	0.6042	0.6518	0.8398	0.9578	0.9856	0.9924	(86)
MIT	19.0113	19.2055	19.5679	20.0968	20.5508	20.8504	20.9410	20.9218	20.7087	20.1256	19.5369	19.0182	(87)
Th 2	19.4739	19.4846	19.4952	19.5355	19.5451	19.5813	19.5813	19.5813	19.5813	19.5355	19.5257	19.5056	(88)
util rest of house													
	0.9879	0.9812	0.9642	0.9157	0.8029	0.6034	0.4415	0.4877	0.7501	0.9354	0.9792	0.9897	(89)
MIT 2	17.2557	17.5087	17.9729	18.6526	19.1835	19.5014	19.5633	19.5552	19.3889	18.7006	17.9579	17.2840	(90)
Living area fraction										fLA = Living area / (4) =		0.3412	(91)
MIT	17.8547	18.0877	18.5171	19.1454	19.6501	19.9617	20.0334	20.0215	19.8392	19.1868	18.4967	17.8757	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8547	18.0877	18.5171	19.1454	19.6501	19.9617	20.0334	20.0215	19.8392	19.1868	18.4967	17.8757	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9827	0.9744	0.9551	0.9072	0.8082	0.6385	0.4971	0.5434	0.7696	0.9280	0.9727	0.9851	(94)
Useful gains	575.3631	636.0501	692.7776	725.2817	678.2207	532.6436	390.1306	393.6065	523.0592	567.6610	549.0460	553.4397	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1607.7820	1561.7106	1419.9250	1168.2385	882.7020	589.1049	406.7968	416.6662	642.5740	986.9788	1289.1273	1581.9315	(97)
Space heating kWh													
	768.1196	622.0439	540.9976	318.9289	152.1341	0.0000	0.0000	0.0000	0.0000	311.9724	532.8585	765.1979	(98a)
Space heating requirement - total per year (kWh/year)												4012.2529	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	768.1196	622.0439	540.9976	318.9289	152.1341	0.0000	0.0000	0.0000	0.0000	311.9724	532.8585	765.1979	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4012.2529	
Space heating per m2											(98c) / (4) =	58.9084	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	768.1196	622.0439	540.9976	318.9289	152.1341	0.0000	0.0000	0.0000	0.0000	311.9724	532.8585	765.1979	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	768.1196	622.0439	540.9976	318.9289	152.1341	0.0000	0.0000	0.0000	0.0000	311.9724	532.8585	765.1979	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.6591	15.7713	14.2003	10.4037	8.0362	6.5656	7.3308	9.5289	12.3771	16.2394	18.3424	20.2055	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4012.2529	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1875.2316	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	158.6605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6046.1450	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4012.2529	26.0600	1045.5931	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1875.2316	26.0600	488.6854	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	158.6605	26.0600	41.3469	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1575.6254	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4012.2529	0.1547	620.8088	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1875.2316	0.1412	264.7727	(264)
Space and water heating			885.5815	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	158.6605	0.1443	22.8996	(268)
Total CO2, kg/year			908.4811	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4012.2529	1.5729	6310.6899	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1875.2316	1.5221	2854.2920	(278)
Space and water heating			9164.9819	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	158.6605	1.5338	243.3587	(282)
Total Primary energy kWh/year			9408.3406	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 8

Current energy efficiency rating: E 46
Current environmental impact rating: B 89

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 46
Potential environmental impact rating: B 89

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£1576	£1576	£0
Space heating	£1046	£1046	£0
Water heating	£489	£489	£0
Lighting	£41	£41	£0
Total cost of fuels	£1576	£1576	£0
Total cost of uses	£1576	£1576	£0
Delivered energy	89 kWh/m²	89 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.9 tonnes	0.9 tonnes	0.0 tonnes
CO2 emissions per m²	13 kg/m²	13 kg/m²	0 kg/m²
Primary energy	138 kWh/m²	138 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8476	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9185	0.9005	0.8825	0.7925	0.7745	0.6844	0.6844	0.6664	0.7204	0.7745	0.8105	0.8465	(22b)
Effective ac	0.9219	0.9055	0.8894	0.8140	0.7999	0.7342	0.7342	0.7220	0.7595	0.7999	0.8284	0.8583	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
Corridor Wall	5.8900	2.1000	3.7900	0.1800	0.6822			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			122.2200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		38.6690			(33)
Party Floor 1			68.1100					(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							24.4440	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		63.1130	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	62.3670	61.2587	60.1724	55.0701	54.1155	49.6715	49.6715	48.8485	51.3832	54.1155	56.0467	58.0656	(38)
Heat transfer coeff	125.4799	124.3717	123.2854	118.1830	117.2284	112.7844	112.7844	111.9615	114.4962	117.2284	119.1596	121.1786	(39)
Average = Sum(39)m / 12 =												118.1785	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8423	1.8260	1.8101	1.7352	1.7212	1.6559	1.6559	1.6438	1.6810	1.7212	1.7495	1.7792	(40)
HLP (average)												1.7351	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.1994	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												97.0684	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)										Total = Sum(45)m =		1612.4316	
Distribution loss (46)m = 0.15 x (45)m	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)

Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
											Total per year (kWh/year) = Sum(64)m =	1875.2316	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	73.5717	65.0950	69.2492	61.1309	59.4231	53.7273	53.1634	55.1745	55.6690	61.8584	65.5093	72.8016	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.4600	19.9488	16.2235	12.2822	9.1811	7.7511	8.3753	10.8865	14.6119	18.5531	21.6542	23.0843	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	287.8303	290.8171	283.2905	267.2673	247.0409	228.0309	215.3311	212.3443	219.8709	235.8941	256.1205	275.1305	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	98.8867	96.8675	93.0769	84.9041	79.8697	74.6213	71.4562	74.1593	77.3181	83.1430	90.9851	97.8517	(72)
Total internal gains													
	503.5603	502.0167	486.9741	458.8369	430.4750	404.7865	389.5458	391.7734	406.1841	431.9735	463.1431	490.4497	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	4.0800	36.7938	0.7600	0.8000	0.7700	63.2517	(77)

Solar gains	88.7331	159.6092	240.8659	336.1272	410.8855	423.0434	401.5629	343.4769	273.4906	182.4638	107.8232	74.9397	(83)
Total gains	592.2934	661.6259	727.8400	794.9641	841.3605	827.8299	791.1087	735.2503	679.6747	614.4373	570.9662	565.3893	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6942	38.0301	38.3651	40.0215	40.3474	41.9372	41.9372	42.2454	41.3102	40.3474	39.6935	39.0321	
alpha	3.5129	3.5353	3.5577	3.6681	3.6898	3.7958	3.7958	3.8164	3.7540	3.6898	3.6462	3.6021	
util living area													
	0.9915	0.9866	0.9753	0.9449	0.8752	0.7341	0.5827	0.6347	0.8446	0.9588	0.9864	0.9928	(86)
MIT	18.8920	19.1087	19.4858	20.0345	20.4956	20.8356	20.9492	20.9302	20.6901	20.1018	19.4489	18.9180	(87)
Th 2	19.4405	19.4518	19.4629	19.5157	19.5257	19.5726	19.5726	19.5813	19.5544	19.5257	19.5056	19.4846	(88)
util rest of house													
	0.9885	0.9817	0.9659	0.9220	0.8194	0.6185	0.4142	0.4682	0.7550	0.9369	0.9806	0.9903	(89)
MIT 2	17.0833	17.3654	17.8492	18.5637	19.1087	19.4824	19.5586	19.5593	19.3494	18.6647	17.8335	17.1431	(90)
Living area fraction									fLA = Living area / (4) =			0.3412	(91)
MIT	17.7004	17.9602	18.4076	19.0656	19.5819	19.9441	20.0331	20.0270	19.8068	19.1551	18.3847	17.7487	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.7004	17.9602	18.4076	19.0656	19.5819	19.9441	20.0331	20.0270	19.8068	19.1551	18.3847	17.7487	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9833	0.9748	0.9567	0.9130	0.8220	0.6522	0.4723	0.5251	0.7738	0.9294	0.9742	0.9858	(94)
Useful gains	582.3859	644.9576	696.3090	725.7654	691.5847	539.8699	373.6335	386.0756	525.9454	571.0419	556.2318	557.3628	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1681.4873	1624.3242	1468.0340	1201.3975	923.9842	602.7318	387.2007	406.0887	653.4123	1002.8956	1344.6814	1641.8131	(97)
Space heating kWh													
	817.7315	658.1344	574.1634	342.4551	172.9053	0.0000	0.0000	0.0000	0.0000	321.2992	567.6837	806.8310	(98a)
Space heating requirement - total per year (kWh/year)												4261.2035	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	817.7315	658.1344	574.1634	342.4551	172.9053	0.0000	0.0000	0.0000	0.0000	321.2992	567.6837	806.8310	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4261.2035	
Space heating per m2											(98c) / (4) =	62.5636	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	817.7315	658.1344	574.1634	342.4551	172.9053	0.0000	0.0000	0.0000	0.0000	321.2992	567.6837	806.8310	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	817.7315	658.1344	574.1634	342.4551	172.9053	0.0000	0.0000	0.0000	0.0000	321.2992	567.6837	806.8310	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.6591	15.7713	14.2003	10.4037	8.0362	6.5656	7.3308	9.5289	12.3771	16.2394	18.3424	20.2055	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4261.2035	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1875.2316	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	158.6605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6295.0955	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4261.2035	16.4900	702.6725	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1875.2316	16.4900	309.2257	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	158.6605	16.4900	26.1631	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1038.0613	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.3039	(257)
SAP value		46.4441	
SAP rating (Section 12)		46	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4261.2035	0.1547	659.1637	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1875.2316	0.1412	264.7727	(264)
Space and water heating			923.9364	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	158.6605	0.1443	22.8996	(268)
Total CO2, kg/year			946.8360	(272)
CO2 emissions per m2			13.9000	(273)
EI value			88.7830	
EI rating			89	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8476 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8645	0.8465	0.8285	0.7564	0.7384	0.6664	0.6664	0.6664	0.6664	0.7564	0.7745	0.8105	(22b)
Effective ac	0.8737	0.8583	0.8432	0.7861	0.7726	0.7220	0.7220	0.7220	0.7220	0.7861	0.7999	0.8284	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
Corridor Wall	5.8900	2.1000	3.7900	0.1800	0.6822			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			122.2200					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	38.6690			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)	24.4440 (36)
Point Thermal bridges (36a) =	0.0000
Total fabric heat loss (33) + (36) + (36a) =	63.1130 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	59.1081	58.0656	57.0452	53.1828	52.2720	48.8485	48.8485	48.8485	48.8485	53.1828	54.1155	56.0467	(38)
Heat transfer coeff	122.2210	121.1786	120.1581	116.2957	115.3850	111.9615	111.9615	111.9615	111.9615	116.2957	117.2284	119.1596	(39)
Average = Sum(39)m / 12 =												116.3140	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7945	1.7792	1.7642	1.7075	1.6941	1.6438	1.6438	1.6438	1.6438	1.7075	1.7212	1.7495	(40)
HLP (average)												1.7077	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.1994 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												97.0684	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)											Total = Sum(45)m =	1612.4316	

Distribution loss (46)m = 0.15 x (45)m

	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875 (46)

Water storage loss:

Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												0.7200 (55)
Total storage loss												
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200 (56)
If cylinder contains dedicated solar storage												
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701 (64)
										Total per year (kWh/year) = Sum(64)m =		1875.2316 (64)
Electric shower(s)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000 (64a)
Heat gains from water heating, kWh/month												
	73.5717	65.0950	69.2492	61.1309	59.4231	53.7273	53.1634	55.1745	55.6690	61.8584	65.5093	72.8016 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.4600	19.9488	16.2235	12.2822	9.1811	7.7511	8.3753	10.8865	14.6119	18.5531	21.6542	23.0843	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	287.8303	290.8171	283.2905	267.2673	247.0409	228.0309	215.3311	212.3443	219.8709	235.8941	256.1205	275.1305	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	98.8867	96.8675	93.0769	84.9041	79.8697	74.6213	71.4562	74.1593	77.3181	83.1430	90.9851	97.8517	(72)
Total internal gains													
	503.5603	502.0167	486.9741	458.8369	430.4750	404.7865	389.5458	391.7734	406.1841	431.9735	463.1431	490.4497	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Southeast	4.0800	33.9635	0.7600	0.8000	0.7700	58.3862	(77)

Solar gains	81.9075	150.7420	238.3569	340.6089	408.7455	429.3891	395.1889	332.5381	273.4906	179.6992	101.2884	71.3711	(83)
Total gains	585.4678	652.7587	725.3310	799.4458	839.2205	834.1756	784.7347	724.3115	679.6747	611.6727	564.4315	561.8208	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.6992	39.0321	39.3636	40.6710	40.9920	42.2454	42.2454	42.2454	42.2454	40.6710	40.3474	39.6935	
alpha	3.5799	3.6021	3.6242	3.7114	3.7328	3.8164	3.8164	3.8164	3.8164	3.7114	3.6898	3.6462	
util living area													
	0.9912	0.9862	0.9741	0.9404	0.8636	0.7214	0.6042	0.6518	0.8398	0.9578	0.9856	0.9924	(86)
MIT	19.0113	19.2055	19.5679	20.0968	20.5508	20.8504	20.9410	20.9218	20.7087	20.1256	19.5369	19.0182	(87)
Th 2	19.4739	19.4846	19.4952	19.5355	19.5451	19.5813	19.5813	19.5813	19.5813	19.5355	19.5257	19.5056	(88)
util rest of house													
	0.9879	0.9812	0.9642	0.9157	0.8029	0.6034	0.4415	0.4877	0.7501	0.9354	0.9792	0.9897	(89)
MIT 2	17.2557	17.5087	17.9729	18.6526	19.1835	19.5014	19.5633	19.5552	19.3889	18.7006	17.9579	17.2840	(90)
Living area fraction										fLA = Living area / (4) =		0.3412	(91)
MIT	17.8547	18.0877	18.5171	19.1454	19.6501	19.9617	20.0334	20.0215	19.8392	19.1868	18.4967	17.8757	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.8547	18.0877	18.5171	19.1454	19.6501	19.9617	20.0334	20.0215	19.8392	19.1868	18.4967	17.8757	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9827	0.9744	0.9551	0.9072	0.8082	0.6385	0.4971	0.5434	0.7696	0.9280	0.9727	0.9851	(94)
Useful gains	575.3631	636.0501	692.7776	725.2817	678.2207	532.6436	390.1306	393.6065	523.0592	567.6610	549.0460	553.4397	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1607.7820	1561.7106	1419.9250	1168.2385	882.7020	589.1049	406.7968	416.6662	642.5740	986.9788	1289.1273	1581.9315	(97)
Space heating kWh													
	768.1196	622.0439	540.9976	318.9289	152.1341	0.0000	0.0000	0.0000	0.0000	311.9724	532.8585	765.1979	(98a)
Space heating requirement - total per year (kWh/year)												4012.2529	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	768.1196	622.0439	540.9976	318.9289	152.1341	0.0000	0.0000	0.0000	0.0000	311.9724	532.8585	765.1979	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4012.2529	
Space heating per m2											(98c) / (4) =	58.9084	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	768.1196	622.0439	540.9976	318.9289	152.1341	0.0000	0.0000	0.0000	0.0000	311.9724	532.8585	765.1979	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	768.1196	622.0439	540.9976	318.9289	152.1341	0.0000	0.0000	0.0000	0.0000	311.9724	532.8585	765.1979	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	189.8860	167.4291	176.8860	153.4825	147.3338	131.2160	128.5077	134.5562	137.0558	154.6581	166.6504	187.5701	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	19.6591	15.7713	14.2003	10.4037	8.0362	6.5656	7.3308	9.5289	12.3771	16.2394	18.3424	20.2055	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4012.2529	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1875.2316	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												158.6605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												6046.1450	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4012.2529	26.0600	1045.5931	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1875.2316	26.0600	488.6854	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	158.6605	26.0600	41.3469	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1575.6254	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4012.2529	0.1547	620.8088	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1875.2316	0.1412	264.7727	(264)
Space and water heating			885.5815	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	158.6605	0.1443	22.8996	(268)
Total CO2, kg/year			908.4811	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4012.2529	1.5729	6310.6899	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1875.2316	1.5221	2854.2920	(278)
Space and water heating			9164.9819	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	158.6605	1.5338	243.3587	(282)
Total Primary energy kWh/year			9408.3406	(286)

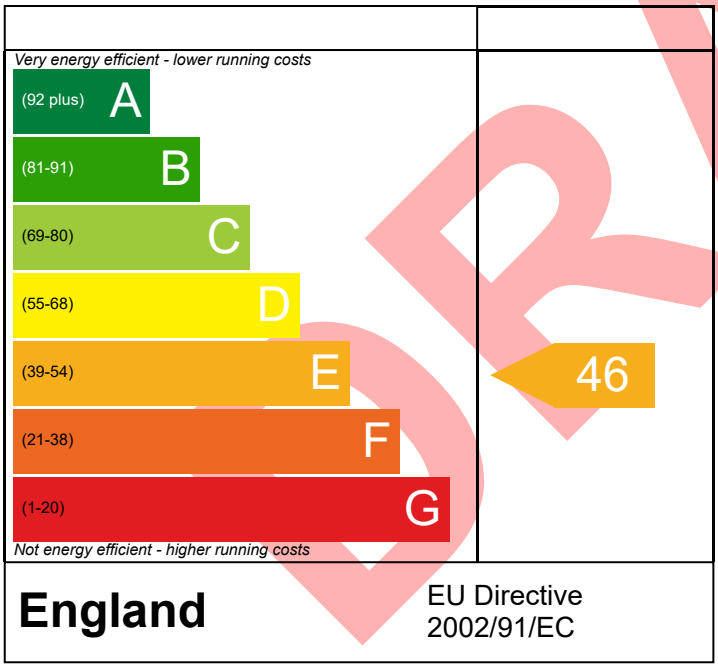
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	68.11 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

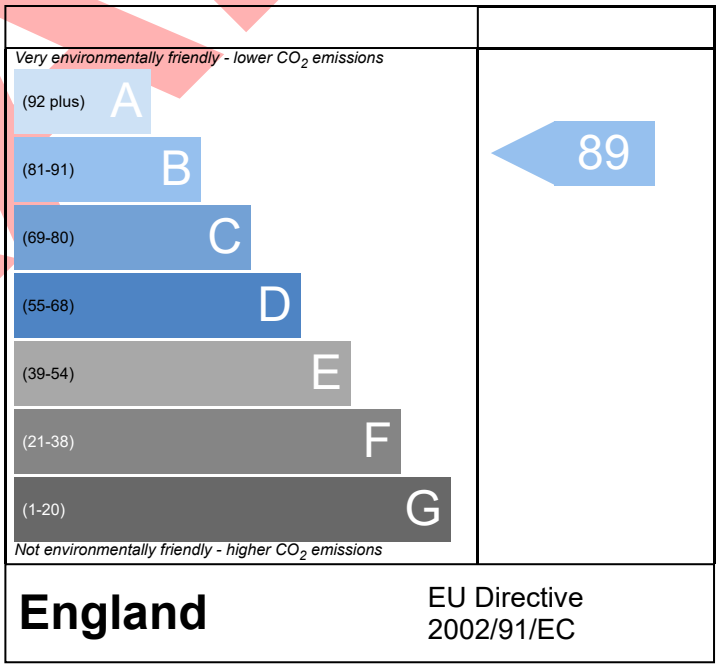
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

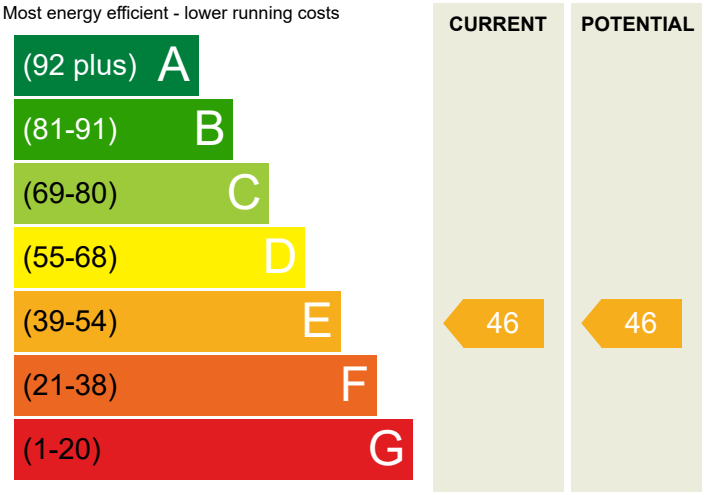
Energy Report

Dwelling Address	
Reference	Apt. 8-Apt. 8
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	68

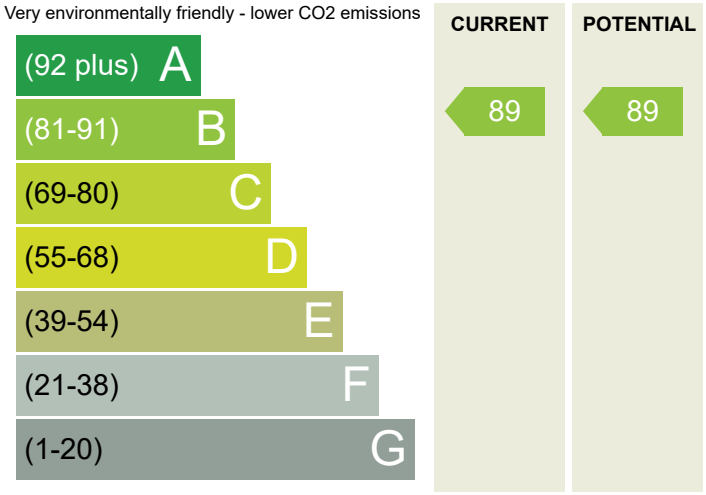
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

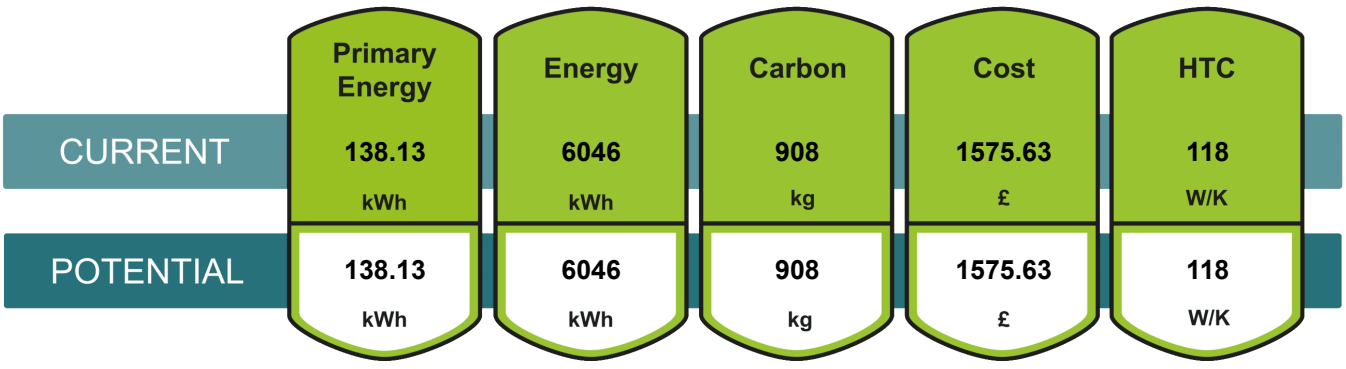
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.29 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£41	£41	You could save £0
Heating	£1046	£1046	
Hot Water	£489	£489	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1576	£1576	

Estimated energy use and potential savings

Space Heating
4012
kWh per year

Water Heating
1875
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 8	Issued on Date	01/10/2024
Assessment Reference	Apt. 8	Prop Type Ref	Detached Flat
Property			

SAP Rating	46 E	DER	14.26	TER	
Environmental	89 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.91	DFEE	71.29	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	147.56	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	48.22	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	5.89	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	68.11	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NE1	New Glazing	External Wall 1	North East	5.36
D SW	New Door	Corridor Wall	South West	2.10
W SE1	New Glazing	External Wall 1	South East	4.08

Comments

Thermal Bridging

Default

Y-value: 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing

No

Property Tested? Yes

Test Method: Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	100.00	10.00	1000.00	10

Comments

Main Heating 1

Fuel Type	SAP table	
Winter Efficiency	Electricity	
Summer Efficiency		%
Model Name		%
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue		
Heat Emitter	No	

Flow Temperature	
Flow Temperature Value	

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	Hot Water Cylinder	
Independent Time Control	No	
Cylinder Stat	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day
Pipes insulation		

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 9	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 9	**Prop Type Ref**	
Property			

SAP Rating	48 E	**DER**	14.29	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.84	**DFEE**	70.94	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	147.75	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.77 m	62.84 m²	3.01 m

8.0 Living Area	19.79	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	48.64	37.88	0.00	None	10.76	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	16.87	14.77	0.00	None	2.10	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	62.84	62.84	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	62.84

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SW1	New Glazing	External Wall 1	South West	9.40	0
D NE	New Door	Corridor Wall	North East	2.10	0
W SE1	New Glazing	External Wall 1	South East	1.36	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	100.00	10.00	1000.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None	
28.0 Water Heating		

Summary for Input Data

Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 9	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 9	**Prop Type Ref**	
Property			

SAP Rating	48 E	**DER**	14.29	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.84	**DFEE**	70.94	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	147.75	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	62.8400	(1b)	x 3.0100	(2b) =	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	189.1484	(5)

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2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8557 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9274	0.9092	0.8910	0.8001	0.7819	0.6910	0.6910	0.6728	0.7274	0.7819	0.8183	0.8547	(22b)
Effective ac	0.9300	0.9133	0.8970	0.8201	0.8057	0.7387	0.7387	0.7263	0.7645	0.8057	0.8348	0.8652	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			128.3500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		41.2822			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		25.6700 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	66.9522 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	58.0521	57.0098	55.9881	51.1893	50.2914	46.1118	46.1118	45.3377	47.7217	50.2914	52.1078	54.0067	(38)
Heat transfer coeff	125.0043	123.9620	122.9403	118.1414	117.2436	113.0639	113.0639	112.2899	114.6738	117.2436	119.0599	120.9588	(39)
Average = Sum(39)m / 12 =												118.1371	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9892	1.9727	1.9564	1.8800	1.8657	1.7992	1.7992	1.7869	1.8249	1.8657	1.8947	1.9249	(40)
HLP (average)												1.8800	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0607	(42)
Hot water usage for mixer showers													
	66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)
Average daily hot water use (litres/day)												93.3593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	
Distribution loss (46)m = 0.15 x (45)m													
	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
										Total per year (kWh/year) = Sum(64)m =		1813.6181	(64)
12Total per year (kWh/year)												1814	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	71.4427	63.2239	67.2854	59.4553	57.8347	52.3346	51.8143	53.7485	54.2021	60.1770	63.6663	70.7021	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	91.6751	101.4975	91.6751	94.7310	91.6751	94.7310	91.6751	91.6751	94.7310	91.6751	94.7310	91.6751	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	180.0485	181.9168	177.2086	167.1855	154.5332	142.6417	134.6975	132.8292	137.5373	147.5604	160.2128	172.1042	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	96.0252	94.0831	90.4374	82.5769	77.7349	72.6870	69.6428	72.2426	75.2807	80.8831	88.4255	95.0297	(72)
Total internal gains													
	421.6591	431.4077	413.2315	398.4037	377.8535	363.9700	349.9258	350.6573	361.4594	374.0290	397.2796	412.7194	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	9.4000	36.7938	0.7600	0.8000	0.7700	145.7269	(79)

Solar gains	166.8108	284.1405	388.7734	481.7091	539.5543	535.6525	516.4262	473.2711	420.9594	314.0358	199.8009	142.7553	(83)
Total gains	588.4699	715.5482	802.0049	880.1128	917.4078	899.6225	866.3520	823.9284	782.4187	688.0647	597.0805	555.4747	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9099	35.2035	35.4960	36.9378	37.2207	38.5967	38.5967	38.8627	38.0548	37.2207	36.6529	36.0775	
alpha	3.3273	3.3469	3.3664	3.4625	3.4814	3.5731	3.5731	3.5908	3.5370	3.4814	3.4435	3.4052	
util living area													
	0.9893	0.9790	0.9614	0.9190	0.8386	0.6897	0.5376	0.5774	0.7839	0.9356	0.9807	0.9912	(86)
MIT	18.7725	19.0784	19.4954	20.0655	20.5156	20.8427	20.9517	20.9376	20.7298	20.1314	19.3936	18.7853	(87)
Th 2	19.3405	19.3516	19.3626	19.4145	19.4243	19.4705	19.4705	19.4792	19.4527	19.4243	19.4045	19.3839	(88)
util rest of house													
	0.9855	0.9716	0.9471	0.8874	0.7718	0.5661	0.3675	0.4087	0.6772	0.9035	0.9726	0.9881	(89)
MIT 2	16.8718	17.2648	17.7942	18.5235	19.0418	19.3896	19.4585	19.4614	19.2889	18.6247	17.7000	16.9136	(90)

Living area fraction											fLA = Living area / (4) =	0.3149	(91)
MIT	17.4704	17.8360	18.3300	19.0091	19.5059	19.8472	19.9287	19.9263	19.7427	19.0992	18.2334	17.5031	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4704	17.8360	18.3300	19.0091	19.5059	19.8472	19.9287	19.9263	19.7427	19.0992	18.2334	17.5031	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9788	0.9617	0.9347	0.8771	0.7759	0.5998	0.4216	0.4620	0.7005	0.8947	0.9637	0.9823	(94)
Useful gains	575.9937	688.1152	749.6047	771.9592	711.8298	539.6356	365.2935	380.6321	548.0776	615.6246	575.3993	545.6602	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1646.3564	1603.5660	1454.3791	1194.3045	915.1920	593.2676	376.3599	395.9698	647.0699	996.4788	1325.5404	1609.1223	(97)
Space heating kWh	796.3499	615.1829	524.3522	304.0886	151.3015	0.0000	0.0000	0.0000	0.0000	283.3555	540.1016	791.2158	(98a)
Space heating requirement - total per year (kWh/year)												4005.9480	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	796.3499	615.1829	524.3522	304.0886	151.3015	0.0000	0.0000	0.0000	0.0000	283.3555	540.1016	791.2158	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4005.9480	
Space heating per m2											(98c) / (4) =	63.7484	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	796.3499	615.1829	524.3522	304.0886	151.3015	0.0000	0.0000	0.0000	0.0000	283.3555	540.1016	791.2158	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	796.3499	615.1829	524.3522	304.0886	151.3015	0.0000	0.0000	0.0000	0.0000	283.3555	540.1016	791.2158	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7245	14.2193	12.8029	9.3799	7.2453	5.9195	6.6094	8.5912	11.1591	14.6414	16.5374	18.2172	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4005.9480	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1813.6181	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	143.0472	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5962.6133	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4005.9480	0.1550	620.9765	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1813.6181	0.1412	256.0483	(264)

Space and water heating			877.0248	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.0472	0.1443	20.6461	(268)
Total CO2, kg/year			897.6709	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			14.2900	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4005.9480	1.5739	6304.9191	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1813.6181	1.5220	2760.4167	(278)
Space and water heating			9065.3358	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	143.0472	1.5338	219.4105	(282)
Total Primary energy kWh/year			9284.7464	(286)
Dwelling Primary energy Rate (DPER)			147.7500	(287)

Full SAP Calculation Printout

Property Reference	Apt. 9	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 9	**Prop Type Ref**	
Property			

SAP Rating	48 E	**DER**	14.29	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.84	**DFEE**	70.94	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	147.75	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	62.8400	(1b)	x 3.0100	(2b) =	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	189.1484	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8557 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9274	0.9092	0.8910	0.8001	0.7819	0.6910	0.6910	0.6728	0.7274	0.7819	0.8183	0.8547	(22b)

If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)	0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =	0.0000 (23c)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Effective ac	0.9300	0.9133	0.8970	0.8201	0.8057	0.7387	0.7387	0.7263	0.7645	0.8057	0.8348	0.8652	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			128.3500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		41.2822			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)	25.6700 (36)
Point Thermal bridges (36a) =	0.0000
Total fabric heat loss (33) + (36) + (36a) =	66.9522 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	58.0521	57.0098	55.9881	51.1893	50.2914	46.1118	46.1118	45.3377	47.7217	50.2914	52.1078	54.0067	(38)

Heat transfer coeff

	125.0043	123.9620	122.9403	118.1414	117.2436	113.0639	113.0639	112.2899	114.6738	117.2436	119.0599	120.9588	(39)
Average = Sum(39)m / 12 =												118.1371	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9892	1.9727	1.9564	1.8800	1.8657	1.7992	1.7992	1.7869	1.8249	1.8657	1.8947	1.9249	(40)
HLP (average)												1.8800	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0607	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	25.3965	25.0193	24.4882	23.5089	22.7755	21.9624	21.5232	22.0506	22.6249	23.4950	24.4945	25.3106	(42b)
Hot water usage for other uses													
	35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)
Average daily hot water use (litres/day)												56.0316	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	61.1300	59.4534	57.6229	55.3442	53.3115	51.1989	50.7597	52.5866	54.4602	56.6297	58.9286	61.0441	(44)
Energy conte	96.8150	84.6609	88.5642	75.7634	71.7675	62.9551	61.3895	65.1131	67.1549	76.8460	83.9546	95.5804	(45)
Energy content (annual)										Total = Sum(45)m =		930.5644	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	82.2927	71.9618	75.2796	64.3989	61.0023	53.5118	52.1811	55.3462	57.0817	65.3191	71.3614	81.2433	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	82.2927	71.9618	75.2796	64.3989	61.0023	53.5118	52.1811	55.3462	57.0817	65.3191	71.3614	81.2433	(64)
										Total per year (kWh/year) = Sum(64)m =		790.9798	(64)
12Total per year (kWh/year)												791	(64)
Electric shower(s)													
	47.0654	41.9357	45.7922	43.6989	44.5189	42.4667	43.8823	44.5189	43.6989	45.7922	44.9311	47.0654	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		535.3665	(64a)
Heat gains from water heating, kWh/month													
	32.3395	28.4744	30.2679	27.0244	26.3803	23.9946	24.0158	24.9663	25.1951	27.7778	29.0731	32.0772	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	91.6751	101.4975	91.6751	94.7310	91.6751	94.7310	91.6751	91.6751	94.7310	91.6751	94.7310	91.6751	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	180.0485	181.9168	177.2086	167.1855	154.5332	142.6417	134.6975	132.8292	137.5373	147.5604	160.2128	172.1042	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	43.4671	42.3726	40.6827	37.5340	35.4574	33.3259	32.2793	33.5568	34.9932	37.3358	40.3793	43.1145	(72)
Total internal gains													
	369.1011	379.6972	363.4768	353.3608	335.5760	324.6089	312.5623	311.9714	321.1719	330.4817	349.2334	360.8042	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	9.4000	36.7938	0.7600	0.8000	0.7700	145.7269	(79)

Solar gains	166.8108	284.1405	388.7734	481.7091	539.5543	535.6525	516.4262	473.2711	420.9594	314.0358	199.8009	142.7553	(83)
Total gains	535.9118	663.8376	752.2502	835.0699	875.1304	860.2614	828.9885	785.2425	742.1312	644.5174	549.0343	503.5595	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9099	35.2035	35.4960	36.9378	37.2207	38.5967	38.5967	38.8627	38.0548	37.2207	36.6529	36.0775	
alpha	3.3273	3.3469	3.3664	3.4625	3.4814	3.5731	3.5731	3.5908	3.5370	3.4814	3.4435	3.4052	
util living area													
	0.9919	0.9831	0.9676	0.9289	0.8535	0.7094	0.5573	0.5992	0.8039	0.9457	0.9849	0.9935	(86)
MIT	18.6976	19.0073	19.4311	20.0156	20.4817	20.8271	20.9458	20.9297	20.7043	20.0797	19.3264	18.7101	(87)
Th 2	19.3405	19.3516	19.3626	19.4145	19.4243	19.4705	19.4705	19.4792	19.4527	19.4243	19.4045	19.3839	(88)
util rest of house													
	0.9890	0.9770	0.9553	0.9002	0.7900	0.5863	0.3830	0.4271	0.7005	0.9175	0.9784	0.9911	(89)
MIT 2	17.3427	17.6561	18.0793	18.6760	19.1009	19.3999	19.4598	19.4632	19.3100	18.7554	18.0108	17.3844	(90)
Living area fraction										fLA = Living area / (4) =		0.3149	(91)
MIT	17.7694	18.0816	18.5050	19.0979	19.5358	19.8494	19.9278	19.9251	19.7491	19.1725	18.4251	17.8019	(92)

Temperature adjustment												0.0000	
adjusted MIT	17.7694	18.0816	18.5050	19.0979	19.5358	19.8494	19.9278	19.9251	19.7491	19.1725	18.4251	17.8019	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9848	0.9703	0.9465	0.8929	0.7953	0.6204	0.4387	0.4818	0.7239	0.9115	0.9726	0.9876	(94)
Useful gains	527.7557	644.1084	711.9762	745.6170	696.0199	533.7061	363.6987	378.2997	537.2056	587.5016	534.0059	497.3244	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1683.7370	1634.0179	1475.9041	1204.7892	918.6940	593.5178	376.2543	395.8294	647.8006	1005.0673	1348.3690	1645.2697	(97)
Space heating kWh													
	860.0501	665.2192	568.3624	330.6040	165.6695	0.0000	0.0000	0.0000	0.0000	310.6689	586.3414	854.0713	(98a)
Space heating requirement - total per year (kWh/year)												4340.9868	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	860.0501	665.2192	568.3624	330.6040	165.6695	0.0000	0.0000	0.0000	0.0000	310.6689	586.3414	854.0713	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4340.9868	
Space heating per m2											(98c) / (4) =	69.0800	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	1062.8007	836.6729	853.4032	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7448	0.8230	0.7970	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	791.5217	688.5720	680.1369	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	970.9711	936.2412	886.8878	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	129.2036	184.2659	153.8227	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction											fC = cooled area / (4) =	1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	32.3009	46.0665	38.4557	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												116.8230	(107)
Energy for space heating												69.0800	(99)
Energy for space cooling												1.8591	(108)
Total												70.9390	(109)
Fabric Energy Efficiency (DFEE)												70.9	(109)

Full SAP Calculation Printout

Property Reference	Apt. 9	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 9	**Prop Type Ref**	
Property			

SAP Rating	48 E	**DER**	14.29	**TER**	
Environmental	89 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.84	**DFEE**	70.94	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	147.75	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	62.8400	(1b)	x 3.0100	(2b) =	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	189.1484	(5)

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2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8557 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9274	0.9092	0.8910	0.8001	0.7819	0.6910	0.6910	0.6728	0.7274	0.7819	0.8183	0.8547	(22b)
Effective ac	0.9300	0.9133	0.8970	0.8201	0.8057	0.7387	0.7387	0.7263	0.7645	0.8057	0.8348	0.8652	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			128.3500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		41.2822			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		25.6700 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	66.9522 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	58.0521	57.0098	55.9881	51.1893	50.2914	46.1118	46.1118	45.3377	47.7217	50.2914	52.1078	54.0067	(38)
Heat transfer coeff	125.0043	123.9620	122.9403	118.1414	117.2436	113.0639	113.0639	112.2899	114.6738	117.2436	119.0599	120.9588	(39)
Average = Sum(39)m / 12 =												118.1371	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9892	1.9727	1.9564	1.8800	1.8657	1.7992	1.7992	1.7869	1.8249	1.8657	1.8947	1.9249	(40)
HLP (average)												1.8800	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0607	(42)
Hot water usage for mixer showers													
	66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)
Average daily hot water use (litres/day)												93.3593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	
Distribution loss (46)m = 0.15 x (45)m													
	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
										Total per year (kWh/year) = Sum(64)m =		1813.6181	(64)
12Total per year (kWh/year)												1814	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	71.4427	63.2239	67.2854	59.4553	57.8347	52.3346	51.8143	53.7485	54.2021	60.1770	63.6663	70.7021	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	91.6751	101.4975	91.6751	94.7310	91.6751	94.7310	91.6751	91.6751	94.7310	91.6751	94.7310	91.6751	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	180.0485	181.9168	177.2086	167.1855	154.5332	142.6417	134.6975	132.8292	137.5373	147.5604	160.2128	172.1042	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	96.0252	94.0831	90.4374	82.5769	77.7349	72.6870	69.6428	72.2426	75.2807	80.8831	88.4255	95.0297	(72)
Total internal gains													
	421.6591	431.4077	413.2315	398.4037	377.8535	363.9700	349.9258	350.6573	361.4594	374.0290	397.2796	412.7194	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	9.4000	36.7938	0.7600	0.8000	0.7700	145.7269	(79)

Solar gains	166.8108	284.1405	388.7734	481.7091	539.5543	535.6525	516.4262	473.2711	420.9594	314.0358	199.8009	142.7553	(83)
Total gains	588.4699	715.5482	802.0049	880.1128	917.4078	899.6225	866.3520	823.9284	782.4187	688.0647	597.0805	555.4747	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9099	35.2035	35.4960	36.9378	37.2207	38.5967	38.5967	38.8627	38.0548	37.2207	36.6529	36.0775	
alpha	3.3273	3.3469	3.3664	3.4625	3.4814	3.5731	3.5731	3.5908	3.5370	3.4814	3.4435	3.4052	
util living area													
	0.9893	0.9790	0.9614	0.9190	0.8386	0.6897	0.5376	0.5774	0.7839	0.9356	0.9807	0.9912	(86)
MIT	18.7725	19.0784	19.4954	20.0655	20.5156	20.8427	20.9517	20.9376	20.7298	20.1314	19.3936	18.7853	(87)
Th 2	19.3405	19.3516	19.3626	19.4145	19.4243	19.4705	19.4705	19.4792	19.4527	19.4243	19.4045	19.3839	(88)
util rest of house													
	0.9855	0.9716	0.9471	0.8874	0.7718	0.5661	0.3675	0.4087	0.6772	0.9035	0.9726	0.9881	(89)
MIT 2	16.8718	17.2648	17.7942	18.5235	19.0418	19.3896	19.4585	19.4614	19.2889	18.6247	17.7000	16.9136	(90)

Living area fraction											fLA = Living area / (4) =	0.3149	(91)
MIT	17.4704	17.8360	18.3300	19.0091	19.5059	19.8472	19.9287	19.9263	19.7427	19.0992	18.2334	17.5031	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.4704	17.8360	18.3300	19.0091	19.5059	19.8472	19.9287	19.9263	19.7427	19.0992	18.2334	17.5031	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9788	0.9617	0.9347	0.8771	0.7759	0.5998	0.4216	0.4620	0.7005	0.8947	0.9637	0.9823	(94)
Useful gains	575.9937	688.1152	749.6047	771.9592	711.8298	539.6356	365.2935	380.6321	548.0776	615.6246	575.3993	545.6602	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1646.3564	1603.5660	1454.3791	1194.3045	915.1920	593.2676	376.3599	395.9698	647.0699	996.4788	1325.5404	1609.1223	(97)
Space heating kWh	796.3499	615.1829	524.3522	304.0886	151.3015	0.0000	0.0000	0.0000	0.0000	283.3555	540.1016	791.2158	(98a)
Space heating requirement - total per year (kWh/year)												4005.9480	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	796.3499	615.1829	524.3522	304.0886	151.3015	0.0000	0.0000	0.0000	0.0000	283.3555	540.1016	791.2158	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4005.9480	
Space heating per m2											(98c) / (4) =	63.7484	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	796.3499	615.1829	524.3522	304.0886	151.3015	0.0000	0.0000	0.0000	0.0000	283.3555	540.1016	791.2158	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	796.3499	615.1829	524.3522	304.0886	151.3015	0.0000	0.0000	0.0000	0.0000	283.3555	540.1016	791.2158	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7245	14.2193	12.8029	9.3799	7.2453	5.9195	6.6094	8.5912	11.1591	14.6414	16.5374	18.2172	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4005.9480	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1813.6181	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	143.0472	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5962.6133	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4005.9480	0.1550	620.9765	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1813.6181	0.1412	256.0483	(264)

Space and water heating			877.0248	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.0472	0.1443	20.6461	(268)
Total CO2, kg/year			897.6709	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			14.2900	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4005.9480	1.5739	6304.9191	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1813.6181	1.5220	2760.4167	(278)
Space and water heating			9065.3358	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	143.0472	1.5338	219.4105	(282)
Total Primary energy kWh/year			9284.7464	(286)
Dwelling Primary energy Rate (DPER)			147.7500	(287)

Full SAP Calculation Printout

Property Reference	Apt. 9	Issued on Date	01/10/2024
Assessment Reference	Apt. 9	Prop Type Ref	
Property			

SAP Rating	48 E	DER	14.29	TER	
Environmental	89 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.84	DFEE	70.94	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	147.75	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	62.8400	(1b)	x 3.0100	(2b) =	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		189.1484	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8557 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9274	0.9092	0.8910	0.8001	0.7819	0.6910	0.6910	0.6728	0.7274	0.7819	0.8183	0.8547	(22b)
Effective ac	0.9300	0.9133	0.8970	0.8201	0.8057	0.7387	0.7387	0.7263	0.7645	0.8057	0.8348	0.8652	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			128.3500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		41.2822			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		25.6700 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	66.9522 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	58.0521	57.0098	55.9881	51.1893	50.2914	46.1118	46.1118	45.3377	47.7217	50.2914	52.1078	54.0067	(38)
Heat transfer coeff	125.0043	123.9620	122.9403	118.1414	117.2436	113.0639	113.0639	112.2899	114.6738	117.2436	119.0599	120.9588	(39)
Average = Sum(39)m / 12 =												118.1371	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9892	1.9727	1.9564	1.8800	1.8657	1.7992	1.7992	1.7869	1.8249	1.8657	1.8947	1.9249	(40)
HLP (average)												1.8800	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0607	(42)
Hot water usage for mixer showers													
	66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)
Average daily hot water use (litres/day)												93.3593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	
Distribution loss (46)m = 0.15 x (45)m													
	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
										Total per year (kWh/year) = Sum(64)m =		1813.6181	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	71.4427	63.2239	67.2854	59.4553	57.8347	52.3346	51.8143	53.7485	54.2021	60.1770	63.6663	70.7021	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.2498	17.9857	14.6270	11.0735	8.2776	6.9883	7.5511	9.8152	13.1740	16.7274	19.5233	20.8126	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	268.7291	271.5176	264.4905	249.5307	230.6465	212.8981	201.0411	198.2525	205.2796	220.2395	239.1236	256.8720	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	96.0252	94.0831	90.4374	82.5769	77.7349	72.6870	69.6428	72.2426	75.2807	80.8831	88.4255	95.0297	(72)
Total internal gains													
	475.6426	474.2250	460.1934	433.8197	407.2976	383.2120	368.8736	370.9489	384.3729	408.4885	437.7110	463.3529	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	9.4000	36.7938	0.7600	0.8000	0.7700	145.7269	(79)

Solar gains	166.8108	284.1405	388.7734	481.7091	539.5543	535.6525	516.4262	473.2711	420.9594	314.0358	199.8009	142.7553	(83)
Total gains	642.4534	758.3655	848.9668	915.5287	946.8519	918.8645	885.2998	844.2200	805.3322	722.5242	637.5118	606.1082	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9099	35.2035	35.4960	36.9378	37.2207	38.5967	38.5967	38.8627	38.0548	37.2207	36.6529	36.0775	
alpha	3.3273	3.3469	3.3664	3.4625	3.4814	3.5731	3.5731	3.5908	3.5370	3.4814	3.4435	3.4052	
util living area													
	0.9862	0.9753	0.9551	0.9109	0.8282	0.6803	0.5281	0.5664	0.7727	0.9271	0.9766	0.9885	(86)
MIT	18.8486	19.1364	19.5546	20.1034	20.5379	20.8497	20.9543	20.9413	20.7433	20.1708	19.4493	18.8579	(87)
Th 2	19.3405	19.3516	19.3626	19.4145	19.4243	19.4705	19.4705	19.4792	19.4527	19.4243	19.4045	19.3839	(88)
util rest of house													
	0.9813	0.9667	0.9389	0.8771	0.7593	0.5567	0.3601	0.3996	0.6643	0.8919	0.9670	0.9845	(89)
MIT 2	16.9678	17.3369	17.8658	18.5659	19.0627	19.3938	19.4593	19.4627	19.2989	18.6688	17.7690	17.0055	(90)
Living area fraction									fLA = Living area / (4) =			0.3149	(91)

MIT	17.5601	17.9036	18.3976	19.0501	19.5273	19.8523	19.9301	19.9283	19.7538	19.1418	18.2982	17.5889	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5601	17.9036	18.3976	19.0501	19.5273	19.8523	19.9301	19.9283	19.7538	19.1418	18.2982	17.5889	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9734	0.9559	0.9259	0.8673	0.7646	0.5907	0.4135	0.4523	0.6886	0.8837	0.9573	0.9777	(94)
Useful gains	625.3726	724.9115	786.0541	794.0307	723.9203	542.7545	366.1082	381.8522	554.5911	638.4829	610.2649	592.5788	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1657.5659	1611.9552	1462.6964	1199.1484	917.7023	593.8473	376.5143	396.1968	648.3408	1001.4746	1333.2536	1619.5002	(97)
Space heating kWh													
	767.9518	596.0934	503.4219	291.6847	144.1738	0.0000	0.0000	0.0000	0.0000	270.0658	520.5518	764.0295	(98a)
Space heating requirement - total per year (kWh/year)												3857.9727	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	767.9518	596.0934	503.4219	291.6847	144.1738	0.0000	0.0000	0.0000	0.0000	270.0658	520.5518	764.0295	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3857.9727	
Space heating per m2											(98c) / (4) =	61.3936	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	767.9518	596.0934	503.4219	291.6847	144.1738	0.0000	0.0000	0.0000	0.0000	270.0658	520.5518	764.0295	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	767.9518	596.0934	503.4219	291.6847	144.1738	0.0000	0.0000	0.0000	0.0000	270.0658	520.5518	764.0295	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7245	14.2193	12.8029	9.3799	7.2453	5.9195	6.6094	8.5912	11.1591	14.6414	16.5374	18.2172	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3857.9727	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1813.6181	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	143.0472	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5814.6380	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3857.9727	16.4900	636.1797	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1813.6181	16.4900	299.0656	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)

Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	143.0472	16.4900	23.5885	(250)
Additional standing charges			0.0000	(251)
Total energy cost			958.8338	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.2009	(257)
SAP value		48.1141	
SAP rating (Section 12)		48	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3857.9727	0.1551	598.1856	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1813.6181	0.1412	256.0483	(264)
Space and water heating			854.2338	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.0472	0.1443	20.6461	(268)
Total CO2, kg/year			874.8800	(272)
CO2 emissions per m2			13.9200	(273)
EI value			89.1289	
EI rating			89	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Ground floor	62.8400 (1b)	x 3.0100 (2b)	= 189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	189.1484	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8557	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8729	0.8547	0.8365	0.7637	0.7456	0.6728	0.6728	0.6728	0.6728	0.7637	0.7819	0.8183	(22b)
Effective ac	0.8809	0.8652	0.8499	0.7917	0.7779	0.7263	0.7263	0.7263	0.7263	0.7917	0.8057	0.8348	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			128.3500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		41.2822			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		25.6700 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	66.9522 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.9871	54.0067	53.0469	49.4142	48.5576	45.3377	45.3377	45.3377	45.3377	49.4142	50.2914	52.1078	(38)
Heat transfer coeff	121.9392	120.9588	119.9990	116.3663	115.5098	112.2899	112.2899	112.2899	112.2899	116.3663	117.2436	119.0599	(39)
Average = Sum(39)m / 12 =												116.3835	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9405	1.9249	1.9096	1.8518	1.8382	1.7869	1.7869	1.7869	1.7869	1.8518	1.8657	1.8947	(40)
HLP (average)												1.8521	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.0607 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)

Average daily hot water use (litres/day)		93.3593 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	
Distribution loss (46)m = 0.15 x (45)m	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)

Water storage loss:		
Store volume		150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):		1.2000 (48)
Temperature factor from Table 2b		0.6000 (49)
Enter (49) or (54) in (55)		0.7200 (55)

Total storage loss

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
								Total per year (kWh/year) = Sum(64)m =			1813.6181	(64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =

Heat gains from water heating, kWh/month

71.4427	63.2239	67.2854	59.4553	57.8347	52.3346	51.8143	53.7485	54.2021	60.1770	63.6663	70.7021	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	20.2498	17.9857	14.6270	11.0735	8.2776	6.9883	7.5511	9.8152	13.1740	16.7274	19.5233	20.8126	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	268.7291	271.5176	264.4905	249.5307	230.6465	212.8981	201.0411	198.2525	205.2796	220.2395	239.1236	256.8720	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	(69)
Pumps, fans 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)	
Losses e.g. evaporation (negative values) (Table 5)	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)	96.0252	94.0831	90.4374	82.5769	77.7349	72.6870	69.6428	72.2426	75.2807	80.8831	88.4255	95.0297	(72)
Total internal gains	475.6426	474.2250	460.1934	433.8197	407.2976	383.2120	368.8736	370.9489	384.3729	408.4885	437.7110	463.3529	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)
Southwest	9.4000	33.9635	0.7600	0.8000	0.7700	134.5171	(79)

Solar gains	153.9792	268.3549	384.7237	488.1319	536.7441	543.6873	508.2290	458.1987	420.9594	309.2776	187.6917	135.9574	(83)
Total gains	629.6218	742.5799	844.9171	921.9515	944.0417	926.8993	877.1025	829.1477	805.3322	717.7661	625.4027	599.3103	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)		21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)		

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.7874	36.0775	36.3660	37.5013	37.7794	38.8627	38.8627	38.8627	38.8627	37.5013	37.2207	36.6529	
alpha	3.3858	3.4052	3.4244	3.5001	3.5186	3.5908	3.5908	3.5908	3.5908	3.5001	3.4814	3.4435	
util living area													
	0.9860	0.9752	0.9531	0.9042	0.8146	0.6669	0.5493	0.5843	0.7668	0.9260	0.9758	0.9881	(86)
MIT	18.9618	19.2255	19.6353	20.1663	20.5899	20.8635	20.9468	20.9338	20.7596	20.1924	19.5323	18.9565	(87)
Th 2	19.3733	19.3839	19.3943	19.4340	19.4434	19.4792	19.4792	19.4792	19.4792	19.4340	19.4243	19.4045	(88)
util rest of house													
	0.9809	0.9664	0.9361	0.8680	0.7410	0.5417	0.3856	0.4184	0.6590	0.8901	0.9655	0.9838	(89)
MIT 2	17.1314	17.4694	17.9860	18.6532	19.1316	19.4114	19.4644	19.4594	19.3353	18.7013	17.8863	17.1435	(90)
Living area fraction										fLA = Living area / (4) =		0.3149	(91)
MIT	17.7079	18.0225	18.5054	19.1297	19.5909	19.8687	19.9313	19.9237	19.7839	19.1709	18.4047	17.7144	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.7079	18.0225	18.5054	19.1297	19.5909	19.8687	19.9313	19.9237	19.7839	19.1709	18.4047	17.7144	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9731	0.9558	0.9235	0.8593	0.7491	0.5768	0.4374	0.4706	0.6838	0.8822	0.9558	0.9769	(94)
Useful gains	612.7010	709.7825	780.2493	792.2084	707.1722	534.6641	383.6327	390.1885	550.6796	633.1995	597.7767	585.4578	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1586.1700	1550.9920	1416.6384	1167.1246	876.8201	580.3912	396.5284	406.9084	638.2432	985.7279	1278.5012	1561.4015	(97)
Space heating kWh													
	724.2610	565.2928	473.4735	269.9396	126.2181	0.0000	0.0000	0.0000	0.0000	262.2811	490.1216	726.1021	(98a)
Space heating requirement - total per year (kWh/year)												3637.6899	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	724.2610	565.2928	473.4735	269.9396	126.2181	0.0000	0.0000	0.0000	0.0000	262.2811	490.1216	726.1021	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3637.6899	
Space heating per m2											(98c) / (4) =	57.8881	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	724.2610	565.2928	473.4735	269.9396	126.2181	0.0000	0.0000	0.0000	0.0000	262.2811	490.1216	726.1021	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	724.2610	565.2928	473.4735	269.9396	126.2181	0.0000	0.0000	0.0000	0.0000	262.2811	490.1216	726.1021	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7245	14.2193	12.8029	9.3799	7.2453	5.9195	6.6094	8.5912	11.1591	14.6414	16.5374	18.2172	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3637.6899	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1813.6181	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	143.0472	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5594.3552	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3637.6899	26.0600	947.9820	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1813.6181	26.0600	472.6289	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	143.0472	26.0600	37.2781	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1457.8890	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3637.6899	0.1551	564.2382	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1813.6181	0.1412	256.0483	(264)
Space and water heating			820.2865	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.0472	0.1443	20.6461	(268)
Total CO2, kg/year			840.9326	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3637.6899	1.5742	5726.6260	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1813.6181	1.5220	2760.4167	(278)
Space and water heating			8487.0427	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	143.0472	1.5338	219.4105	(282)
Total Primary energy kWh/year			8706.4533	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 9

Current energy efficiency rating: E 48
Current environmental impact rating: B 89

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: E 48
Potential environmental impact rating: B 89

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£1458	£1458	£0
Space heating	£948	£948	£0
Water heating	£473	£473	£0
Lighting	£37	£37	£0
Total cost of fuels	£1458	£1458	£0
Total cost of uses	£1458	£1458	£0
Delivered energy	89 kWh/m²	89 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.8 tonnes	0.8 tonnes	0.0 tonnes
CO2 emissions per m²	13 kg/m²	13 kg/m²	0 kg/m²
Primary energy	139 kWh/m²	139 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	62.8400	(1b)	x 3.0100	(2b) =	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		189.1484	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8557	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9274	0.9092	0.8910	0.8001	0.7819	0.6910	0.6910	0.6728	0.7274	0.7819	0.8183	0.8547	(22b)
Effective ac	0.9300	0.9133	0.8970	0.8201	0.8057	0.7387	0.7387	0.7263	0.7645	0.8057	0.8348	0.8652	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			128.3500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		41.2822			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	25.6700	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	66.9522	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	58.0521	57.0098	55.9881	51.1893	50.2914	46.1118	46.1118	45.3377	47.7217	50.2914	52.1078	54.0067	(38)
Heat transfer coeff	125.0043	123.9620	122.9403	118.1414	117.2436	113.0639	113.0639	112.2899	114.6738	117.2436	119.0599	120.9588	(39)
Average = Sum(39)m / 12 =												118.1371	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9892	1.9727	1.9564	1.8800	1.8657	1.7992	1.7992	1.7869	1.8249	1.8657	1.8947	1.9249	(40)
HLP (average)												1.8800	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.0607	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)
Average daily hot water use (litres/day)												93.3593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	
Distribution loss (46)m = 0.15 x (45)m	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)

Water storage loss:		
Store volume	150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2000	(48)
Temperature factor from Table 2b	0.6000	(49)
Enter (49) or (54) in (55)	0.7200	(55)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)

Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
											Total per year (kWh/year) = Sum(64)m =	1813.6181	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	71.4427	63.2239	67.2854	59.4553	57.8347	52.3346	51.8143	53.7485	54.2021	60.1770	63.6663	70.7021	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.2498	17.9857	14.6270	11.0735	8.2776	6.9883	7.5511	9.8152	13.1740	16.7274	19.5233	20.8126	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	268.7291	271.5176	264.4905	249.5307	230.6465	212.8981	201.0411	198.2525	205.2796	220.2395	239.1236	256.8720	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	96.0252	94.0831	90.4374	82.5769	77.7349	72.6870	69.6428	72.2426	75.2807	80.8831	88.4255	95.0297	(72)
Total internal gains													
	475.6426	474.2250	460.1934	433.8197	407.2976	383.2120	368.8736	370.9489	384.3729	408.4885	437.7110	463.3529	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	9.4000	36.7938	0.7600	0.8000	0.7700	145.7269	(79)

Solar gains	166.8108	284.1405	388.7734	481.7091	539.5543	535.6525	516.4262	473.2711	420.9594	314.0358	199.8009	142.7553	(83)
Total gains	642.4534	758.3655	848.9668	915.5287	946.8519	918.8645	885.2998	844.2200	805.3322	722.5242	637.5118	606.1082	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9099	35.2035	35.4960	36.9378	37.2207	38.5967	38.5967	38.8627	38.0548	37.2207	36.6529	36.0775	
alpha	3.3273	3.3469	3.3664	3.4625	3.4814	3.5731	3.5731	3.5908	3.5370	3.4814	3.4435	3.4052	
util living area													
	0.9862	0.9753	0.9551	0.9109	0.8282	0.6803	0.5281	0.5664	0.7727	0.9271	0.9766	0.9885	(86)
MIT	18.8486	19.1364	19.5546	20.1034	20.5379	20.8497	20.9543	20.9413	20.7433	20.1708	19.4493	18.8579	(87)
Th 2	19.3405	19.3516	19.3626	19.4145	19.4243	19.4705	19.4705	19.4792	19.4527	19.4243	19.4045	19.3839	(88)
util rest of house													
	0.9813	0.9667	0.9389	0.8771	0.7593	0.5567	0.3601	0.3996	0.6643	0.8919	0.9670	0.9845	(89)
MIT 2	16.9678	17.3369	17.8658	18.5659	19.0627	19.3938	19.4593	19.4627	19.2989	18.6688	17.7690	17.0055	(90)
Living area fraction										fLA = Living area / (4) =		0.3149	(91)
MIT	17.5601	17.9036	18.3976	19.0501	19.5273	19.8523	19.9301	19.9283	19.7538	19.1418	18.2982	17.5889	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5601	17.9036	18.3976	19.0501	19.5273	19.8523	19.9301	19.9283	19.7538	19.1418	18.2982	17.5889	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9734	0.9559	0.9259	0.8673	0.7646	0.5907	0.4135	0.4523	0.6886	0.8837	0.9573	0.9777	(94)
Useful gains	625.3726	724.9115	786.0541	794.0307	723.9203	542.7545	366.1082	381.8522	554.5911	638.4829	610.2649	592.5788	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1657.5659	1611.9552	1462.6964	1199.1484	917.7023	593.8473	376.5143	396.1968	648.3408	1001.4746	1333.2536	1619.5002	(97)
Space heating kWh													
	767.9518	596.0934	503.4219	291.6847	144.1738	0.0000	0.0000	0.0000	0.0000	270.0658	520.5518	764.0295	(98a)
Space heating requirement - total per year (kWh/year)												3857.9727	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	767.9518	596.0934	503.4219	291.6847	144.1738	0.0000	0.0000	0.0000	0.0000	270.0658	520.5518	764.0295	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3857.9727	
Space heating per m2											(98c) / (4) =	61.3936	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	767.9518	596.0934	503.4219	291.6847	144.1738	0.0000	0.0000	0.0000	0.0000	270.0658	520.5518	764.0295	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	767.9518	596.0934	503.4219	291.6847	144.1738	0.0000	0.0000	0.0000	0.0000	270.0658	520.5518	764.0295	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7245	14.2193	12.8029	9.3799	7.2453	5.9195	6.6094	8.5912	11.1591	14.6414	16.5374	18.2172	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3857.9727	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1813.6181	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	143.0472	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5814.6380	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3857.9727	16.4900	636.1797	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1813.6181	16.4900	299.0656	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	143.0472	16.4900	23.5885	(250)
Additional standing charges			0.0000	(251)
Total energy cost			958.8338	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	3.2009	(257)
SAP value		48.1141	
SAP rating (Section 12)		48	(258)
SAP band		E	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3857.9727	0.1551	598.1856	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1813.6181	0.1412	256.0483	(264)
Space and water heating			854.2338	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.0472	0.1443	20.6461	(268)
Total CO2, kg/year			874.8800	(272)
CO2 emissions per m2			13.9200	(273)
EI value			89.1289	
EI rating			89	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	62.8400	(1b)	x 3.0100	(2b) =	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		189.1484	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8557 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8729	0.8547	0.8365	0.7637	0.7456	0.6728	0.6728	0.6728	0.6728	0.7637	0.7819	0.8183	(22b)
Effective ac	0.8809	0.8652	0.8499	0.7917	0.7779	0.7263	0.7263	0.7263	0.7263	0.7917	0.8057	0.8348	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			128.3500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		41.2822			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	25.6700	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	66.9522	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.9871	54.0067	53.0469	49.4142	48.5576	45.3377	45.3377	45.3377	45.3377	49.4142	50.2914	52.1078	(38)
Heat transfer coeff	121.9392	120.9588	119.9990	116.3663	115.5098	112.2899	112.2899	112.2899	112.2899	116.3663	117.2436	119.0599	(39)
Average = Sum(39)m / 12 =												116.3835	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9405	1.9249	1.9096	1.8518	1.8382	1.7869	1.7869	1.7869	1.7869	1.8518	1.8657	1.8947	(40)
HLP (average)												1.8521	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.0607 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)

Average daily hot water use (litres/day)	93.3593 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	

Distribution loss (46)m = 0.15 x (45)m

	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403 (46)

Water storage loss:

Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000 (48)
Temperature factor from Table 2b												0.6000 (49)
Enter (49) or (54) in (55)												0.7200 (55)
Total storage loss												
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200 (56)
If cylinder contains dedicated solar storage												
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200 (57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month												
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556 (64)
										Total per year (kWh/year) = Sum(64)m =		1813.6181 (64)
Electric shower(s)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
	71.4427	63.2239	67.2854	59.4553	57.8347	52.3346	51.8143	53.7485	54.2021	60.1770	63.6663	70.7021 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	20.2498	17.9857	14.6270	11.0735	8.2776	6.9883	7.5511	9.8152	13.1740	16.7274	19.5233	20.8126	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	268.7291	271.5176	264.4905	249.5307	230.6465	212.8981	201.0411	198.2525	205.2796	220.2395	239.1236	256.8720	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	96.0252	94.0831	90.4374	82.5769	77.7349	72.6870	69.6428	72.2426	75.2807	80.8831	88.4255	95.0297	(72)
Total internal gains													
	475.6426	474.2250	460.1934	433.8197	407.2976	383.2120	368.8736	370.9489	384.3729	408.4885	437.7110	463.3529	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)
Southwest	9.4000	33.9635	0.7600	0.8000	0.7700	134.5171	(79)

Solar gains	153.9792	268.3549	384.7237	488.1319	536.7441	543.6873	508.2290	458.1987	420.9594	309.2776	187.6917	135.9574	(83)
Total gains	629.6218	742.5799	844.9171	921.9515	944.0417	926.8993	877.1025	829.1477	805.3322	717.7661	625.4027	599.3103	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.7874	36.0775	36.3660	37.5013	37.7794	38.8627	38.8627	38.8627	38.8627	37.5013	37.2207	36.6529	
alpha	3.3858	3.4052	3.4244	3.5001	3.5186	3.5908	3.5908	3.5908	3.5908	3.5001	3.4814	3.4435	
util living area													
	0.9860	0.9752	0.9531	0.9042	0.8146	0.6669	0.5493	0.5843	0.7668	0.9260	0.9758	0.9881	(86)
MIT	18.9618	19.2255	19.6353	20.1663	20.5899	20.8635	20.9468	20.9338	20.7596	20.1924	19.5323	18.9565	(87)
Th 2	19.3733	19.3839	19.3943	19.4340	19.4434	19.4792	19.4792	19.4792	19.4792	19.4340	19.4243	19.4045	(88)
util rest of house													
	0.9809	0.9664	0.9361	0.8680	0.7410	0.5417	0.3856	0.4184	0.6590	0.8901	0.9655	0.9838	(89)
MIT 2	17.1314	17.4694	17.9860	18.6532	19.1316	19.4114	19.4644	19.4594	19.3353	18.7013	17.8863	17.1435	(90)
Living area fraction										fLA = Living area / (4) =		0.3149	(91)
MIT	17.7079	18.0225	18.5054	19.1297	19.5909	19.8687	19.9313	19.9237	19.7839	19.1709	18.4047	17.7144	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.7079	18.0225	18.5054	19.1297	19.5909	19.8687	19.9313	19.9237	19.7839	19.1709	18.4047	17.7144	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9731	0.9558	0.9235	0.8593	0.7491	0.5768	0.4374	0.4706	0.6838	0.8822	0.9558	0.9769	(94)
Useful gains	612.7010	709.7825	780.2493	792.2084	707.1722	534.6641	383.6327	390.1885	550.6796	633.1995	597.7767	585.4578	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1586.1700	1550.9920	1416.6384	1167.1246	876.8201	580.3912	396.5284	406.9084	638.2432	985.7279	1278.5012	1561.4015	(97)
Space heating kWh													
	724.2610	565.2928	473.4735	269.9396	126.2181	0.0000	0.0000	0.0000	0.0000	262.2811	490.1216	726.1021	(98a)
Space heating requirement - total per year (kWh/year)												3637.6899	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	724.2610	565.2928	473.4735	269.9396	126.2181	0.0000	0.0000	0.0000	0.0000	262.2811	490.1216	726.1021	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3637.6899	
Space heating per m2											(98c) / (4) =	57.8881	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	724.2610	565.2928	473.4735	269.9396	126.2181	0.0000	0.0000	0.0000	0.0000	262.2811	490.1216	726.1021	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	724.2610	565.2928	473.4735	269.9396	126.2181	0.0000	0.0000	0.0000	0.0000	262.2811	490.1216	726.1021	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	183.4831	161.8017	170.9798	148.4431	142.5568	127.0274	124.4501	130.2675	132.6440	149.6012	161.1078	181.2556	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	17.7245	14.2193	12.8029	9.3799	7.2453	5.9195	6.6094	8.5912	11.1591	14.6414	16.5374	18.2172	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3637.6899	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1813.6181	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												143.0472	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5594.3552	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3637.6899	26.0600	947.9820	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1813.6181	26.0600	472.6289	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	143.0472	26.0600	37.2781	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1457.8890	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3637.6899	0.1551	564.2382	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1813.6181	0.1412	256.0483	(264)
Space and water heating			820.2865	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	143.0472	0.1443	20.6461	(268)
Total CO2, kg/year			840.9326	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3637.6899	1.5742	5726.6260	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1813.6181	1.5220	2760.4167	(278)
Space and water heating			8487.0427	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	143.0472	1.5338	219.4105	(282)
Total Primary energy kWh/year			8706.4533	(286)

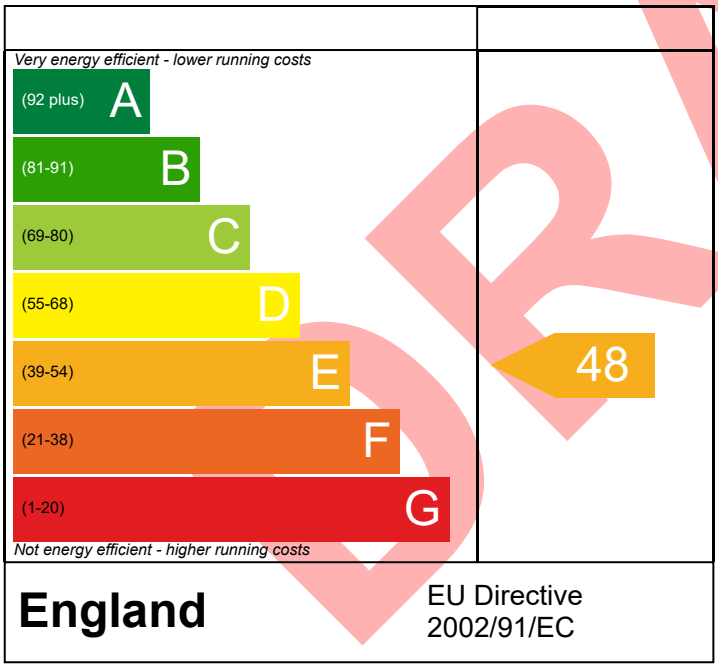
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	62.84 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

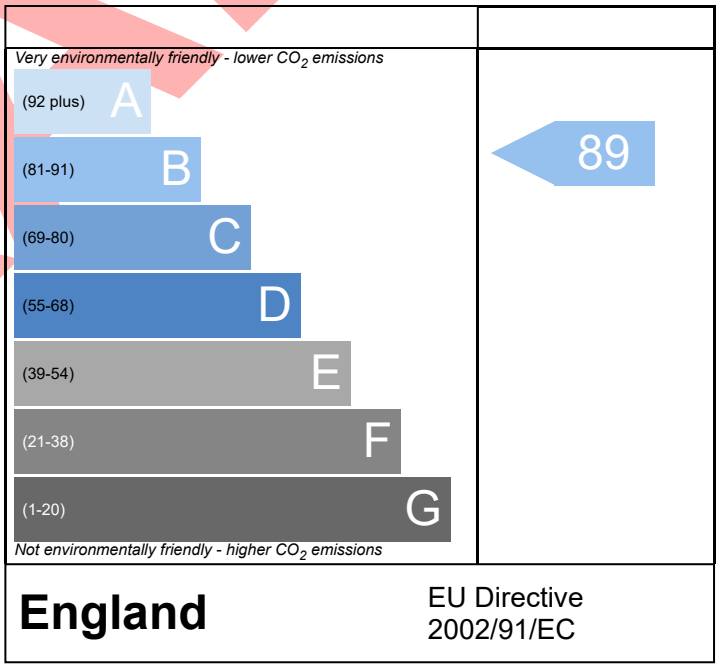
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

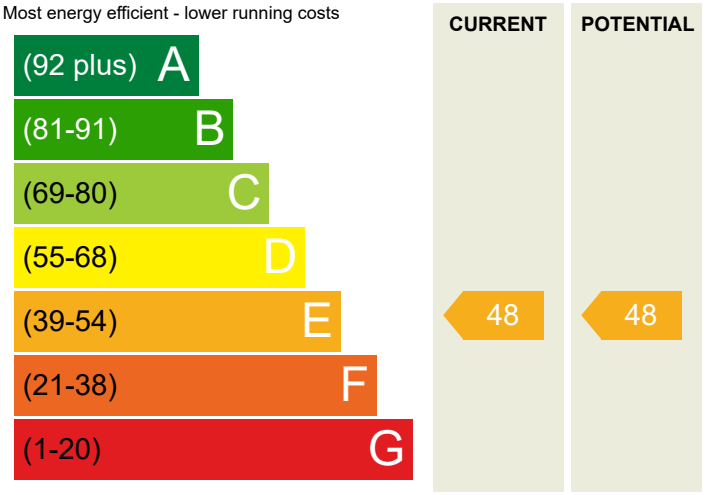
Energy Report

Dwelling Address	
Reference	Apt. 9-Apt. 9
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	63

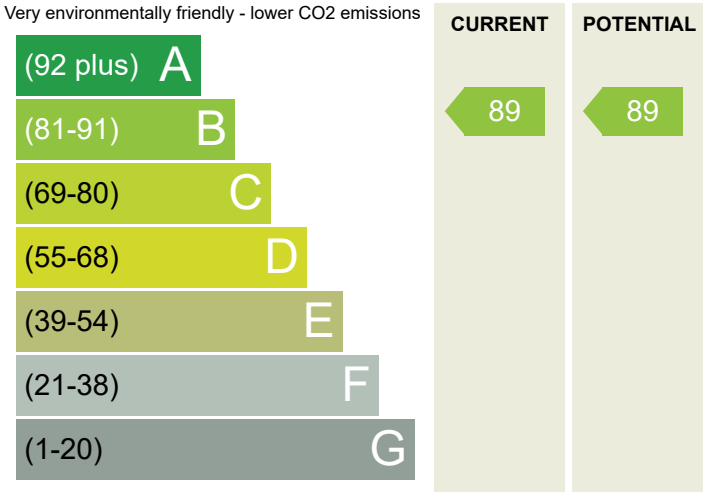
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

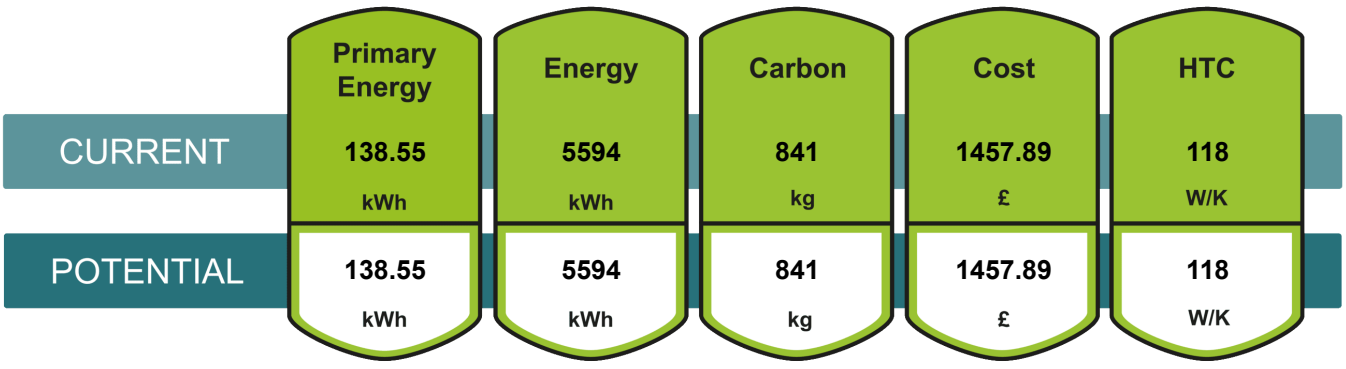
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.27 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£37	£37	You could save £0
Heating	£948	£948	
Hot Water	£473	£473	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1458	£1458	

Estimated energy use and potential savings

Space Heating
3638
kWh per year

Water Heating
1814
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 9	Issued on Date	01/10/2024
Assessment Reference	Apt. 9	Prop Type Ref	Detached Flat
Property			

SAP Rating	48 E	DER	14.29	TER	
Environmental	89 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.84	DFEE	70.94	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	147.75	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northeast (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	48.64	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	16.87	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	62.84	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SW1	New Glazing	External Wall 1	South West	9.40
D NE	New Door	Corridor Wall	North East	2.10
W SE1	New Glazing	External Wall 1	South East	1.36

Comments

Thermal Bridging

Default

Y-value: 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing

No

Property Tested? Yes

Test Method: Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	100.00	10.00	1000.00	10

Comments

Main Heating 1

Fuel Type	SAP table	
Winter Efficiency	Electricity	
Summer Efficiency		%
Model Name		%
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue		
Heat Emitter	No	

Flow Temperature	
Flow Temperature Value	

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	Hot Water Cylinder	
Independent Time Control	No	
Cylinder Stat	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day
Pipes insulation		

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 10	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 10	**Prop Type Ref**	
Property			

SAP Rating	57 D	**DER**	11.13	**TER**	
Environmental	91 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.73	**DFEE**	52.35	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	115.51	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	27.53 m	70.46 m²	2.12 m

8.0 Living Area	20.19	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	10.89	9.71	0.00	None	1.18	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	16.87	14.77	0.00	None	2.10	Enter Gross Area
Dormer Wall 1	Timber Frame	Other	0.18	0.00	15.30	10.32	0.00	None	4.98	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	37.11	37.11	None	0.00	Enter Gross Area	0.00
Dormer Roof 1	External Flat Roof	Other	0.16	0.00	13.92	13.92	None	0.00	Enter Gross Area	0.00
Slope Roof 1	External Slope Roof	Other	0.16	0.00	21.08	21.08	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	70.46

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)

Summary for Input Data

New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SE1	New Glazing	Dormer Wall 1	South East	4.98	0
D NW	New Door	Corridor Wall	North West	2.10	0
W SW1	New Glazing	External Wall 1	South West	1.18	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	100.00	10.00	1000.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

Summary for Input Data

elmhurst energy

27.0 Secondary Heating	None
28.0 Water Heating	
Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 10	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 10	**Prop Type Ref**	
Property			

SAP Rating	57 D	**DER**	11.13	**TER**	
Environmental	91 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.73	**DFEE**	52.35	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	115.51	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		70.4600 (1b)	x	2.1200 (2b)	=	149.3752	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	149.3752	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8839	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9579	0.9391	0.9204	0.8264	0.8077	0.7137	0.7137	0.6950	0.7513	0.8077	0.8452	0.8828	(22b)
Effective ac	0.9588	0.9410	0.9235	0.8415	0.8262	0.7547	0.7547	0.7415	0.7822	0.8262	0.8572	0.8897	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			115.1700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.0735			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.0340	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	53.1075	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	47.2630	46.3848	45.5240	41.4807	40.7243	37.2027	37.2027	36.5506	38.5592	40.7243	42.2546	43.8545	(38)

Heat transfer coeff

	100.3705	99.4923	98.6315	94.5882	93.8317	90.3102	90.3102	89.6581	91.6666	93.8317	95.3621	96.9620 (39)
Average = Sum(39)m / 12 =												94.5846

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4245	1.4120	1.3998	1.3424	1.3317	1.2817	1.2817	1.2725	1.3010	1.3317	1.3534	1.3761	(40)
HLP (average)												1.3424	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.2572 (42)

Hot water usage for mixer showers

	69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760 (42a)

Hot water usage for baths

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)

Hot water usage for other uses

	37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464 (42c)

Average daily hot water use (litres/day) 98.6159 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	
Distribution loss (46)m = 0.15 x (45)m													
	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)

Water storage loss:

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.7200 (55)

Total storage loss

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
										Total per year (kWh/year) = Sum(64)m =		1900.9365	(64)
12Total per year (kWh/year)												1901	(64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

	74.4599	65.8756	70.0685	61.8300	60.0857	54.3084	53.7263	55.7695	56.2810	62.5599	66.2781	73.6776	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	115.5555	127.9365	115.5555	119.4074	115.5555	119.4074	115.5555	115.5555	119.4074	115.5555	119.4074	115.5555	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	198.3683	200.4267	195.2395	184.1966	170.2568	157.1554	148.4029	146.3445	151.5317	162.5746	176.5144	189.6157	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)

Water heating gains (Table 5)

	100.0805	98.0291	94.1781	85.8750	80.7604	75.4283	72.2127	74.9589	78.1681	84.0859	92.0529	99.0290	(72)

Total internal gains

	470.8629	483.2509	461.8317	446.3376	423.4314	408.8497	393.0298	393.7175	405.9657	419.0746	444.8333	461.0589	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	36.7938	0.7600	0.8000	0.7700	77.2042	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	95.4976	162.6678	222.5691	275.7740	308.8898	306.6561	295.6492	270.9433	240.9953	179.7826	114.3841	81.7261	(83)
Total gains	566.3606	645.9187	684.4009	722.1115	732.3212	715.5058	688.6790	664.6608	646.9611	598.8572	559.2174	542.7849	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	48.7499	49.1803	49.6095	51.7301	52.1471	54.1805	54.1805	54.5746	53.3788	52.1471	51.3103	50.4636	
alpha	4.2500	4.2787	4.3073	4.4487	4.4765	4.6120	4.6120	4.6383	4.5586	4.4765	4.4207	4.3642	
util living area													
	0.9934	0.9876	0.9777	0.9482	0.8811	0.7247	0.5567	0.5929	0.8107	0.9534	0.9871	0.9945	(86)

MIT	19.3865	19.6004	19.8926	20.3242	20.6652	20.9117	20.9793	20.9727	20.8401	20.4037	19.8652	19.4085	(87)
Th 2	19.7446	19.7541	19.7635	19.8077	19.8161	19.8552	19.8552	19.8625	19.8401	19.8161	19.7992	19.7817	(88)

util rest of house													
	0.9912	0.9835	0.9698	0.9284	0.8330	0.6259	0.4220	0.4597	0.7266	0.9315	0.9820	0.9926	(89)
MIT 2	17.9061	18.1841	18.5600	19.1262	19.5298	19.8042	19.8488	19.8531	19.7335	19.2361	18.5533	17.9591	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	18.3303	18.5899	18.9419	19.4695	19.8551	20.1216	20.1727	20.1739	20.0506	19.5706	18.9292	18.3744	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3303	18.5899	18.9419	19.4695	19.8551	20.1216	20.1727	20.1739	20.0506	19.5706	18.9292	18.3744	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9874	0.9780	0.9625	0.9213	0.8349	0.6509	0.4609	0.4979	0.7440	0.9256	0.9768	0.9894	(94)
Useful gains	559.2467	631.6897	658.7700	665.2891	611.4045	465.7295	317.3840	330.9458	481.3118	554.3099	546.2511	537.0499	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1408.2291	1362.0391	1227.1613	999.7483	765.2092	498.6525	322.6538	338.3608	545.4724	841.7311	1128.0610	1374.3785	(97)
Space heating kWh	631.6429	490.7948	422.8831	240.8106	114.4307	0.0000	0.0000	0.0000	0.0000	213.8414	418.9031	622.9725	(98a)
Space heating requirement - total per year (kWh/year)												3156.2791	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	631.6429	490.7948	422.8831	240.8106	114.4307	0.0000	0.0000	0.0000	0.0000	213.8414	418.9031	622.9725	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3156.2791	
Space heating per m2											(98c) / (4) =	44.7953	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	631.6429	490.7948	422.8831	240.8106	114.4307	0.0000	0.0000	0.0000	0.0000	213.8414	418.9031	622.9725	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	631.6429	490.7948	422.8831	240.8106	114.4307	0.0000	0.0000	0.0000	0.0000	213.8414	418.9031	622.9725	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.3416	17.9233	16.1379	11.8233	9.1327	7.4615	8.3311	10.8291	14.0659	18.4553	20.8452	22.9625	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3156.2791	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1900.9365	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	180.3094	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5237.5250	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year

Space heating - main system 1	3156.2791	0.1551	489.6082	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1900.9365	0.1412	268.4125	(264)
Space and water heating			758.0206	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	180.3094	0.1443	26.0242	(268)
Total CO2, kg/year			784.0449	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			11.1300	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3156.2791	1.5743	4968.9238	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1900.9365	1.5221	2893.4565	(278)
Space and water heating			7862.3803	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	180.3094	1.5338	276.5646	(282)
Total Primary energy kWh/year			8138.9449	(286)
Dwelling Primary energy Rate (DPER)			115.5100	(287)

Full SAP Calculation Printout

Property Reference	Apt. 10	Issued on Date	01/10/2024
Assessment Reference	Apt. 10	Prop Type Ref	
Property			

SAP Rating	57 D	DER	11.13	TER	
Environmental	91 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.73	DFEE	52.35	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	115.51	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600	(1b)	x 2.1200	(2b) =	149.3752	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	149.3752	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2008	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9508	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8082	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0305	1.0103	0.9901	0.8890	0.8688	0.7678	0.7678	0.7476	0.8082	0.8688	0.9092	0.9496	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	1.0305	1.0103	0.9901	0.8952	0.8774	0.7948	0.7948	0.7794	0.8266	0.8774	0.9134	0.9509	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			115.1700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.0735			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.0340	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	53.1075	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.7958	49.7998	48.8062	44.1273	43.2519	39.1767	39.1767	38.4220	40.7464	43.2519	45.0228	46.8743	(38)
Heat transfer coeff													
	103.9032	102.9072	101.9137	97.2348	96.3593	92.2842	92.2842	91.5295	93.8539	96.3593	98.1303	99.9817	(39)
Average = Sum(39)m / 12 =												97.2284	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4746	1.4605	1.4464	1.3800	1.3676	1.3097	1.3097	1.2990	1.3320	1.3676	1.3927	1.4190	(40)
HLP (average)												1.3799	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2572	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	26.8137	26.4155	25.8547	24.8207	24.0465	23.1880	22.7243	23.2811	23.8875	24.8061	25.8613	26.7231	(42b)
Hot water usage for other uses													
	37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464	(42c)
Average daily hot water use (litres/day)												59.1754	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	64.5601	62.7893	60.8559	58.4493	56.3025	54.0714	53.6077	55.5372	57.5161	59.8073	62.2352	64.4695	(44)
Energy conte	102.2474	89.4111	93.5333	80.0142	75.7940	66.4871	64.8339	68.7666	70.9231	81.1579	88.6654	100.9436	(45)
Energy content (annual)										Total = Sum(45)m =		982.7776	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	86.9103	75.9994	79.5033	68.0121	64.4249	56.5141	55.1088	58.4516	60.2846	68.9842	75.3656	85.8021	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	86.9103	75.9994	79.5033	68.0121	64.4249	56.5141	55.1088	58.4516	60.2846	68.9842	75.3656	85.8021	(64)
										Total per year (kWh/year) = Sum(64)m =		835.3609	(64)
12Total per year (kWh/year)												835	(64)
Electric shower(s)													
	49.7046	44.2872	48.3600	46.1493	47.0153	44.8480	46.3430	47.0153	46.1493	48.3600	47.4506	49.7046	(64a)
							Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					565.3874	(64a)
Heat gains from water heating, kWh/month													
	34.1537	30.0717	31.9658	28.5404	27.8601	25.3405	25.3629	26.3667	26.6085	29.3361	30.7040	33.8767	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	115.5555	127.9365	115.5555	119.4074	115.5555	119.4074	115.5555	115.5555	119.4074	115.5555	119.4074	115.5555	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	198.3683	200.4267	195.2395	184.1966	170.2568	157.1554	148.4029	146.3445	151.5317	162.5746	176.5144	189.6157	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)
Water heating gains (Table 5)													
	45.9056	44.7495	42.9648	39.6394	37.4463	35.1952	34.0900	35.4392	36.9562	39.4302	42.6445	45.5332	(72)
Total internal gains													
	416.6880	429.9713	410.6185	400.1019	380.1173	368.6166	354.9070	354.1977	364.7539	374.4189	395.4249	407.5630	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	36.7938	0.7600	0.8000	0.7700	77.2042	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	95.4976	162.6678	222.5691	275.7740	308.8898	306.6561	295.6492	270.9433	240.9953	179.7826	114.3841	81.7261	(83)
Total gains	512.1856	592.6391	633.1876	675.8759	689.0071	675.2727	650.5562	625.1410	605.7492	554.2015	509.8090	489.2891	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	47.0924	47.5482	48.0118	50.3221	50.7793	53.0216	53.0216	53.4588	52.1348	50.7793	49.8628	48.9395	
alpha	4.1395	4.1699	4.2008	4.3548	4.3853	4.5348	4.5348	4.5639	4.4757	4.3853	4.3242	4.2626	
util living area													
	0.9955	0.9911	0.9835	0.9599	0.9036	0.7605	0.5943	0.6328	0.8436	0.9653	0.9911	0.9963	(86)
MIT	19.2399	19.4601	19.7659	20.2293	20.5997	20.8861	20.9713	20.9623	20.7989	20.3163	19.7488	19.2709	(87)
Th 2	19.7066	19.7173	19.7279	19.7787	19.7883	19.8332	19.8332	19.8416	19.8158	19.7883	19.7689	19.7488	(88)
util rest of house													
	0.9939	0.9880	0.9774	0.9435	0.8608	0.6624	0.4513	0.4927	0.7645	0.9479	0.9874	0.9950	(89)

MIT 2	18.1384	18.3648	18.6753	19.1653	19.5156	19.7805	19.8262	19.8312	19.7078	19.2614	18.6910	18.2002	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	18.4540	18.6786	18.9878	19.4702	19.8263	20.0973	20.1543	20.1553	20.0205	19.5637	18.9941	18.5070	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4540	18.6786	18.9878	19.4702	19.8263	20.0973	20.1543	20.1553	20.0205	19.5637	18.9941	18.5070	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9917	0.9845	0.9725	0.9383	0.8624	0.6870	0.4927	0.5331	0.7804	0.9436	0.9841	0.9932	(94)
Useful gains	507.9277	583.4613	615.7819	634.1587	594.1805	463.9017	320.5489	333.2550	472.7524	522.9659	501.7207	485.9524	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1470.6459	1417.9197	1272.6777	1027.7896	783.0413	507.3142	328.0040	343.7234	555.6589	863.7331	1167.1740	1430.4408	(97)
Space heating kWh													
	716.2623	560.7560	488.7304	283.4142	140.5125	0.0000	0.0000	0.0000	0.0000	253.5308	479.1264	702.6993	(98a)
Space heating requirement - total per year (kWh/year)												3625.0320	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	716.2623	560.7560	488.7304	283.4142	140.5125	0.0000	0.0000	0.0000	0.0000	253.5308	479.1264	702.6993	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3625.0320	
Space heating per m2											(98c) / (4) =	51.4481	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	867.4711	682.9028	695.6242	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7451	0.8338	0.8113	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	646.3911	569.4043	564.3325	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	734.2409	708.0213	680.6968	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	63.2518	103.1310	86.5750	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	15.8130	25.7828	21.6438	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												63.2395	(107)
Energy for space heating												51.4481	(99)
Energy for space cooling												0.8975	(108)
Total												52.3456	(109)
Fabric Energy Efficiency (DFEE)												52.3	(109)

Full SAP Calculation Printout

Property Reference	Apt. 10	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 10	**Prop Type Ref**	
Property			

SAP Rating	57 D	**DER**	11.13	**TER**	
Environmental	91 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.73	**DFEE**	52.35	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	115.51	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		70.4600 (1b)	x	2.1200 (2b)	=	149.3752	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	149.3752	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8839	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9579	0.9391	0.9204	0.8264	0.8077	0.7137	0.7137	0.6950	0.7513	0.8077	0.8452	0.8828	(22b)
Effective ac	0.9588	0.9410	0.9235	0.8415	0.8262	0.7547	0.7547	0.7415	0.7822	0.8262	0.8572	0.8897	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			115.1700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.0735			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.0340	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	53.1075	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	47.2630	46.3848	45.5240	41.4807	40.7243	37.2027	37.2027	36.5506	38.5592	40.7243	42.2546	43.8545	(38)

Heat transfer coeff

	100.3705	99.4923	98.6315	94.5882	93.8317	90.3102	90.3102	89.6581	91.6666	93.8317	95.3621	96.9620 (39)
Average = Sum(39)m / 12 =												94.5846

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4245	1.4120	1.3998	1.3424	1.3317	1.2817	1.2817	1.2725	1.3010	1.3317	1.3534	1.3761	(40)
HLP (average)												1.3424	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.2572 (42)

Hot water usage for mixer showers

	69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760 (42a)

Hot water usage for baths

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)

Hot water usage for other uses

	37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464 (42c)

Average daily hot water use (litres/day) 98.6159 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	
Distribution loss (46)m = 0.15 x (45)m													
	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)

Water storage loss:

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.7200 (55)

Total storage loss

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
										Total per year (kWh/year) = Sum(64)m =		1900.9365	(64)
12Total per year (kWh/year)												1901	(64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

	74.4599	65.8756	70.0685	61.8300	60.0857	54.3084	53.7263	55.7695	56.2810	62.5599	66.2781	73.6776	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	115.5555	127.9365	115.5555	119.4074	115.5555	119.4074	115.5555	115.5555	119.4074	115.5555	119.4074	115.5555	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	198.3683	200.4267	195.2395	184.1966	170.2568	157.1554	148.4029	146.3445	151.5317	162.5746	176.5144	189.6157	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)

Water heating gains (Table 5)

	100.0805	98.0291	94.1781	85.8750	80.7604	75.4283	72.2127	74.9589	78.1681	84.0859	92.0529	99.0290	(72)

Total internal gains

	470.8629	483.2509	461.8317	446.3376	423.4314	408.8497	393.0298	393.7175	405.9657	419.0746	444.8333	461.0589	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	36.7938	0.7600	0.8000	0.7700	77.2042	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	95.4976	162.6678	222.5691	275.7740	308.8898	306.6561	295.6492	270.9433	240.9953	179.7826	114.3841	81.7261	(83)
Total gains	566.3606	645.9187	684.4009	722.1115	732.3212	715.5058	688.6790	664.6608	646.9611	598.8572	559.2174	542.7849	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	48.7499	49.1803	49.6095	51.7301	52.1471	54.1805	54.1805	54.5746	53.3788	52.1471	51.3103	50.4636	
alpha	4.2500	4.2787	4.3073	4.4487	4.4765	4.6120	4.6120	4.6383	4.5586	4.4765	4.4207	4.3642	
util living area													
	0.9934	0.9876	0.9777	0.9482	0.8811	0.7247	0.5567	0.5929	0.8107	0.9534	0.9871	0.9945	(86)

MIT	19.3865	19.6004	19.8926	20.3242	20.6652	20.9117	20.9793	20.9727	20.8401	20.4037	19.8652	19.4085	(87)
Th 2	19.7446	19.7541	19.7635	19.8077	19.8161	19.8552	19.8552	19.8625	19.8401	19.8161	19.7992	19.7817	(88)

util rest of house													
	0.9912	0.9835	0.9698	0.9284	0.8330	0.6259	0.4220	0.4597	0.7266	0.9315	0.9820	0.9926	(89)
MIT 2	17.9061	18.1841	18.5600	19.1262	19.5298	19.8042	19.8488	19.8531	19.7335	19.2361	18.5533	17.9591	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	18.3303	18.5899	18.9419	19.4695	19.8551	20.1216	20.1727	20.1739	20.0506	19.5706	18.9292	18.3744	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3303	18.5899	18.9419	19.4695	19.8551	20.1216	20.1727	20.1739	20.0506	19.5706	18.9292	18.3744	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9874	0.9780	0.9625	0.9213	0.8349	0.6509	0.4609	0.4979	0.7440	0.9256	0.9768	0.9894	(94)
Useful gains	559.2467	631.6897	658.7700	665.2891	611.4045	465.7295	317.3840	330.9458	481.3118	554.3099	546.2511	537.0499	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1408.2291	1362.0391	1227.1613	999.7483	765.2092	498.6525	322.6538	338.3608	545.4724	841.7311	1128.0610	1374.3785	(97)
Space heating kWh	631.6429	490.7948	422.8831	240.8106	114.4307	0.0000	0.0000	0.0000	0.0000	213.8414	418.9031	622.9725	(98a)
Space heating requirement - total per year (kWh/year)												3156.2791	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	631.6429	490.7948	422.8831	240.8106	114.4307	0.0000	0.0000	0.0000	0.0000	213.8414	418.9031	622.9725	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3156.2791	
Space heating per m2											(98c) / (4) =	44.7953	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	631.6429	490.7948	422.8831	240.8106	114.4307	0.0000	0.0000	0.0000	0.0000	213.8414	418.9031	622.9725	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	631.6429	490.7948	422.8831	240.8106	114.4307	0.0000	0.0000	0.0000	0.0000	213.8414	418.9031	622.9725	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.3416	17.9233	16.1379	11.8233	9.1327	7.4615	8.3311	10.8291	14.0659	18.4553	20.8452	22.9625	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3156.2791	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1900.9365	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	180.3094	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5237.5250	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year

Space heating - main system 1	3156.2791	0.1551	489.6082	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1900.9365	0.1412	268.4125	(264)
Space and water heating			758.0206	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	180.3094	0.1443	26.0242	(268)
Total CO2, kg/year			784.0449	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			11.1300	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3156.2791	1.5743	4968.9238	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1900.9365	1.5221	2893.4565	(278)
Space and water heating			7862.3803	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	180.3094	1.5338	276.5646	(282)
Total Primary energy kWh/year			8138.9449	(286)
Dwelling Primary energy Rate (DPER)			115.5100	(287)

Full SAP Calculation Printout

Property Reference	Apt. 10	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 10	**Prop Type Ref**	
Property			

SAP Rating	57 D	**DER**	11.13	**TER**	
Environmental	91 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.73	**DFEE**	52.35	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	115.51	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600 (1b)	x	2.1200 (2b)	=	149.3752	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	149.3752	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8839	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9579	0.9391	0.9204	0.8264	0.8077	0.7137	0.7137	0.6950	0.7513	0.8077	0.8452	0.8828	(22b)
Effective ac	0.9588	0.9410	0.9235	0.8415	0.8262	0.7547	0.7547	0.7415	0.7822	0.8262	0.8572	0.8897	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			115.1700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.0735			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.0340	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	53.1075	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	47.2630	46.3848	45.5240	41.4807	40.7243	37.2027	37.2027	36.5506	38.5592	40.7243	42.2546	43.8545	(38)

Heat transfer coeff

	100.3705	99.4923	98.6315	94.5882	93.8317	90.3102	90.3102	89.6581	91.6666	93.8317	95.3621	96.9620 (39)
Average = Sum(39)m / 12 =												94.5846

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4245	1.4120	1.3998	1.3424	1.3317	1.2817	1.2817	1.2725	1.3010	1.3317	1.3534	1.3761	(40)
HLP (average)												1.3424	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.2572 (42)

Hot water usage for mixer showers

	69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760 (42a)

Hot water usage for baths

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)

Hot water usage for other uses

	37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464 (42c)

Average daily hot water use (litres/day) 98.6159 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	
Distribution loss (46)m = 0.15 x (45)m													
	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)

Water storage loss:

Store volume 150.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.2000 (48)

Temperature factor from Table 2b 0.6000 (49)

Enter (49) or (54) in (55) 0.7200 (55)

Total storage loss

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
										Total per year (kWh/year) = Sum(64)m =		1900.9365	(64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)

Heat gains from water heating, kWh/month

	74.4599	65.8756	70.0685	61.8300	60.0857	54.3084	53.7263	55.7695	56.2810	62.5599	66.2781	73.6776	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	25.5247	22.6708	18.4371	13.9581	10.4338	8.8087	9.5181	12.3720	16.6056	21.0847	24.6089	26.2341	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	296.0721	299.1444	291.4023	274.9202	254.1147	234.5603	221.4969	218.4246	226.1667	242.6487	263.4543	283.0086	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)

Water heating gains (Table 5)

	100.0805	98.0291	94.1781	85.8750	80.7604	75.4283	72.2127	74.9589	78.1681	84.0859	92.0529	99.0290	(72)

Total internal gains

	517.6228	515.7898	499.9630	470.6988	441.2544	414.7428	399.1732	401.7010	416.8859	443.7647	476.0616	504.2171	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	36.7938	0.7600	0.8000	0.7700	77.2042	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	95.4976	162.6678	222.5691	275.7740	308.8898	306.6561	295.6492	270.9433	240.9953	179.7826	114.3841	81.7261	(83)
Total gains	613.1204	678.4576	722.5321	746.4728	750.1442	721.3989	694.8224	672.6443	657.8812	623.5473	590.4458	585.9432	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	48.7499	49.1803	49.6095	51.7301	52.1471	54.1805	54.1805	54.5746	53.3788	52.1471	51.3103	50.4636	
alpha	4.2500	4.2787	4.3073	4.4487	4.4765	4.6120	4.6120	4.6383	4.5586	4.4765	4.4207	4.3642	
util living area													
	0.9911	0.9852	0.9732	0.9424	0.8734	0.7207	0.5524	0.5869	0.8036	0.9468	0.9843	0.9926	(86)
MIT	19.4518	19.6447	19.9421	20.3518	20.6797	20.9137	20.9799	20.9738	20.8463	20.4323	19.9080	19.4696	(87)
Th 2	19.7446	19.7541	19.7635	19.8077	19.8161	19.8552	19.8552	19.8625	19.8401	19.8161	19.7992	19.7817	(88)
util rest of house													

	0.9882	0.9803	0.9637	0.9209	0.8235	0.6218	0.4184	0.4545	0.7185	0.9226	0.9782	0.9901	(89)
MIT 2	17.9889	18.2397	18.6210	19.1583	19.5444	19.8056	19.8490	19.8535	19.7384	19.2690	18.6067	18.0367	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	18.4081	18.6423	18.9995	19.5003	19.8697	20.1231	20.1731	20.1745	20.0559	19.6024	18.9796	18.4473	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4081	18.6423	18.9995	19.5003	19.8697	20.1231	20.1731	20.1745	20.0559	19.6024	18.9796	18.4473	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9836	0.9742	0.9560	0.9140	0.8261	0.6469	0.4571	0.4926	0.7364	0.9170	0.9723	0.9862	(94)
Useful gains	603.0848	660.9779	690.7246	682.2832	619.7273	466.6775	317.5879	331.3190	484.4444	571.7813	574.1084	577.8715	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1416.0337	1367.2523	1232.8450	1002.6649	766.5764	498.7922	322.6844	338.4158	545.9541	844.7069	1132.8618	1381.4436	(97)
Space heating kWh	604.8340	474.6164	403.3376	230.6749	109.2558	0.0000	0.0000	0.0000	0.0000	203.0566	402.3025	597.8576	(98a)
Space heating requirement - total per year (kWh/year)												3025.9354	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	604.8340	474.6164	403.3376	230.6749	109.2558	0.0000	0.0000	0.0000	0.0000	203.0566	402.3025	597.8576	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3025.9354	
Space heating per m2											(98c) / (4) =	42.9454	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	604.8340	474.6164	403.3376	230.6749	109.2558	0.0000	0.0000	0.0000	0.0000	203.0566	402.3025	597.8576	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	604.8340	474.6164	403.3376	230.6749	109.2558	0.0000	0.0000	0.0000	0.0000	203.0566	402.3025	597.8576	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.3416	17.9233	16.1379	11.8233	9.1327	7.4615	8.3311	10.8291	14.0659	18.4553	20.8452	22.9625	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3025.9354	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1900.9365	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	180.3094	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5107.1813	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3025.9354	16.4900	498.9768	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1900.9365	16.4900	313.4644	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	180.3094	16.4900	29.7330	(250)
Additional standing charges			0.0000	(251)
Total energy cost			842.1742	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.6259	(257)
SAP value		57.4347	
SAP rating (Section 12)		57	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3025.9354	0.1551	469.4597	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1900.9365	0.1412	268.4125	(264)
Space and water heating			737.8722	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	180.3094	0.1443	26.0242	(268)
Total CO2, kg/year			763.8964	(272)
CO2 emissions per m2			10.8400	(273)
EI value			91.1344	
EI rating			91	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600	(1b)	x 2.1200	(2b) =	149.3752	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		149.3752	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8839	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9016	0.8828	0.8640	0.7889	0.7701	0.6950	0.6950	0.6950	0.6950	0.7889	0.8077	0.8452	(22b)
Effective ac	0.9064	0.8897	0.8733	0.8112	0.7965	0.7415	0.7415	0.7415	0.7415	0.8112	0.8262	0.8572	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)

External Roof 1	37.1100	37.1100	0.1600	5.9376		(30)
Dormer Roof 1	13.9200	13.9200	0.1600	2.2272		(30)
Slope Roof 1	21.0800	21.0800	0.1600	3.3728		(30)
Total net area of external elements Aum(A, m2)		115.1700				(31)
Fabric heat loss, W/K = Sum (A x U)		(26)...(30) + (32) =		30.0735		(33)
Party Floor 1		70.4600				(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.0340	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	53.1075	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.6806	43.8545	43.0459	39.9852	39.2635	36.5506	36.5506	36.5506	36.5506	39.9852	40.7243	42.2546	(38)
Heat transfer coeff	97.7880	96.9620	96.1533	93.0926	92.3709	89.6581	89.6581	89.6581	89.6581	93.0926	93.8317	95.3621	(39)
Average = Sum(39)m / 12 =												93.1071	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3879	1.3761	1.3647	1.3212	1.3110	1.2725	1.2725	1.2725	1.2725	1.3212	1.3317	1.3534	(40)
HLP (average)												1.3214	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.2572	(42)

Hot water usage for mixer showers

69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464	(42c)

Average daily hot water use (litres/day)	98.6159 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	

Distribution loss (46)m = 0.15 x (45)m

25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)

Water storage loss:	
Store volume	150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):	1.2000 (48)
Temperature factor from Table 2b	0.6000 (49)
Enter (49) or (54) in (55)	0.7200 (55)

Total storage loss

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)

If cylinder contains dedicated solar storage

22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
									Total per year (kWh/year) = Sum(64)m =		1900.9365	(64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

74.4599	65.8756	70.0685	61.8300	60.0857	54.3084	53.7263	55.7695	56.2810	62.5599	66.2781	73.6776	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

25.5247	22.6708	18.4371	13.9581	10.4338	8.8087	9.5181	12.3720	16.6056	21.0847	24.6089	26.2341	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

296.0721	299.1444	291.4023	274.9202	254.1147	234.5603	221.4969	218.4246	226.1667	242.6487	263.4543	283.0086	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	(69)
Pumps, fans 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)

Water heating gains (Table 5)

100.0805	98.0291	94.1781	85.8750	80.7604	75.4283	72.2127	74.9589	78.1681	84.0859	92.0529	99.0290	(72)

Total internal gains

517.6228	515.7898	499.9630	470.6988	441.2544	414.7428	399.1732	401.7010	416.8859	443.7647	476.0616	504.2171	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	33.9635	0.7600	0.8000	0.7700	71.2655	(77)
Southwest	1.1800	33.9635	0.7600	0.8000	0.7700	16.8862	(79)

Solar gains 88.1517	153.6307	220.2507	279.4510	307.2810	311.2559	290.9564	262.3145	240.9953	177.0586	107.4518	77.8343	(83)
Total gains 605.7744	669.4205	720.2137	750.1498	748.5354	725.9987	690.1295	664.0155	657.8812	620.8233	583.5134	582.0515	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	50.0374	50.4636	50.8880	52.5611	52.9718	54.5746	54.5746	54.5746	54.5746	52.5611	52.1471	51.3103	
alpha	4.3358	4.3642	4.3925	4.5041	4.5315	4.6383	4.6383	4.6383	4.6383	4.5041	4.4765	4.4207	
util living area	0.9906	0.9846	0.9713	0.9368	0.8594	0.7068	0.5742	0.6041	0.7964	0.9452	0.9830	0.9920	(86)
MIT	19.5507	19.7246	20.0111	20.4024	20.7220	20.9231	20.9760	20.9699	20.8591	20.4511	19.9792	19.5527	(87)
Th 2	19.7727	19.7817	19.7905	19.8243	19.8323	19.8625	19.8625	19.8625	19.8625	19.8243	19.8161	19.7992	(88)
util rest of house	0.9874	0.9795	0.9613	0.9134	0.8050	0.6064	0.4437	0.4725	0.7115	0.9202	0.9762	0.9893	(89)
MIT 2	18.1340	18.3601	18.7264	19.2314	19.6029	19.8193	19.8544	19.8517	19.7697	19.2977	18.7087	18.1547	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	18.5399	18.7511	19.0945	19.5670	19.9236	20.1356	20.1758	20.1721	20.0818	19.6282	19.0728	18.5553	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5399	18.7511	19.0945	19.5670	19.9236	20.1356	20.1758	20.1721	20.0818	19.6282	19.0728	18.5553	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9828	0.9734	0.9536	0.9071	0.8099	0.6324	0.4812	0.5102	0.7298	0.9149	0.9703	0.9853	(94)
Useful gains	595.3779	651.6378	686.8148	680.4837	606.2361	459.1433	332.0734	338.7648	480.1481	568.0084	566.1933	573.4926	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1353.3789	1313.9386	1191.7756	974.3983	731.9113	487.3463	338.5272	347.1637	536.3196	831.1533	1085.8926	1330.8065	(97)
Space heating kWh	563.9528	445.0661	375.6908	211.6185	93.5023	0.0000	0.0000	0.0000	0.0000	195.7798	374.1835	563.4415	(98a)
Space heating requirement - total per year (kWh/year)												2823.2352	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	563.9528	445.0661	375.6908	211.6185	93.5023	0.0000	0.0000	0.0000	0.0000	195.7798	374.1835	563.4415	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2823.2352	
Space heating per m2											(98c) / (4) =	40.0686	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	563.9528	445.0661	375.6908	211.6185	93.5023	0.0000	0.0000	0.0000	0.0000	195.7798	374.1835	563.4415	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	563.9528	445.0661	375.6908	211.6185	93.5023	0.0000	0.0000	0.0000	0.0000	195.7798	374.1835	563.4415	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.3416	17.9233	16.1379	11.8233	9.1327	7.4615	8.3311	10.8291	14.0659	18.4553	20.8452	22.9625	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 2823.2352 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 1900.9365 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 180.3094 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4904.4811	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2823.2352	26.0600	735.7351	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1900.9365	26.0600	495.3841	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	180.3094	26.0600	46.9886	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1278.1078	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2823.2352	0.1552	438.1880	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1900.9365	0.1412	268.4125	(264)
Space and water heating			706.6005	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	180.3094	0.1443	26.0242	(268)
Total CO2, kg/year			732.6247	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2823.2352	1.5746	4445.5308	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1900.9365	1.5221	2893.4565	(278)
Space and water heating			7338.9873	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	180.3094	1.5338	276.5646	(282)
Total Primary energy kWh/year			7615.5519	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 10

Current energy efficiency rating: D 57
Current environmental impact rating: B 91

N	Solar water heating	Not applicable
U	Solar photovoltaic panels	Not applicable
V2	Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: D 57
Potential environmental impact rating: B 91

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£1278	£1278	£0
Space heating	£736	£736	£0
Water heating	£495	£495	£0
Lighting	£47	£47	£0
Total cost of fuels	£1278	£1278	£0
Total cost of uses	£1278	£1278	£0
Delivered energy	70 kWh/m²	70 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.7 tonnes	0.7 tonnes	0.0 tonnes
CO2 emissions per m²	10 kg/m²	10 kg/m²	0 kg/m²
Primary energy	108 kWh/m²	108 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600 (1b)	x	2.1200 (2b)	=	149.3752	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	149.3752	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8839 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9579	0.9391	0.9204	0.8264	0.8077	0.7137	0.7137	0.6950	0.7513	0.8077	0.8452	0.8828	(22b)
Effective ac	0.9588	0.9410	0.9235	0.8415	0.8262	0.7547	0.7547	0.7415	0.7822	0.8262	0.8572	0.8897	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			115.1700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.0735			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)	23.0340 (36)
Point Thermal bridges (36a) =	0.0000
Total fabric heat loss (33) + (36) + (36a) =	53.1075 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	47.2630	46.3848	45.5240	41.4807	40.7243	37.2027	37.2027	36.5506	38.5592	40.7243	42.2546	43.8545	(38)
Heat transfer coeff	100.3705	99.4923	98.6315	94.5882	93.8317	90.3102	90.3102	89.6581	91.6666	93.8317	95.3621	96.9620	(39)
Average = Sum(39)m / 12 =												94.5846	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4245	1.4120	1.3998	1.3424	1.3317	1.2817	1.2817	1.2725	1.3010	1.3317	1.3534	1.3761	(40)
HLP (average)												1.3424	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.2572 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464	(42c)

Average daily hot water use (litres/day)	98.6159 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	
Distribution loss (46)m = 0.15 x (45)m	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)

Water storage loss:

Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
										Total per year (kWh/year) = Sum(64)m =		1900.9365	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	74.4599	65.8756	70.0685	61.8300	60.0857	54.3084	53.7263	55.7695	56.2810	62.5599	66.2781	73.6776	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	25.5247	22.6708	18.4371	13.9581	10.4338	8.8087	9.5181	12.3720	16.6056	21.0847	24.6089	26.2341	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	296.0721	299.1444	291.4023	274.9202	254.1147	234.5603	221.4969	218.4246	226.1667	242.6487	263.4543	283.0086	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)
Water heating gains (Table 5)													
	100.0805	98.0291	94.1781	85.8750	80.7604	75.4283	72.2127	74.9589	78.1681	84.0859	92.0529	99.0290	(72)
Total internal gains													
	517.6228	515.7898	499.9630	470.6988	441.2544	414.7428	399.1732	401.7010	416.8859	443.7647	476.0616	504.2171	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	36.7938	0.7600	0.8000	0.7700	77.2042	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	95.4976	162.6678	222.5691	275.7740	308.8898	306.6561	295.6492	270.9433	240.9953	179.7826	114.3841	81.7261	(83)
Total gains	613.1204	678.4576	722.5321	746.4728	750.1442	721.3989	694.8224	672.6443	657.8812	623.5473	590.4458	585.9432	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	48.7499	49.1803	49.6095	51.7301	52.1471	54.1805	54.1805	54.5746	53.3788	52.1471	51.3103	50.4636	
alpha	4.2500	4.2787	4.3073	4.4487	4.4765	4.6120	4.6120	4.6383	4.5586	4.4765	4.4207	4.3642	
util living area													
	0.9911	0.9852	0.9732	0.9424	0.8734	0.7207	0.5524	0.5869	0.8036	0.9468	0.9843	0.9926	(86)
MIT	19.4518	19.6447	19.9421	20.3518	20.6797	20.9137	20.9799	20.9738	20.8463	20.4323	19.9080	19.4696	(87)
Th 2	19.7446	19.7541	19.7635	19.8077	19.8161	19.8552	19.8552	19.8625	19.8401	19.8161	19.7992	19.7817	(88)
util rest of house													
	0.9882	0.9803	0.9637	0.9209	0.8235	0.6218	0.4184	0.4545	0.7185	0.9226	0.9782	0.9901	(89)
MIT 2	17.9889	18.2397	18.6210	19.1583	19.5444	19.8056	19.8490	19.8535	19.7384	19.2690	18.6067	18.0367	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	18.4081	18.6423	18.9995	19.5003	19.8697	20.1231	20.1731	20.1745	20.0559	19.6024	18.9796	18.4473	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4081	18.6423	18.9995	19.5003	19.8697	20.1231	20.1731	20.1745	20.0559	19.6024	18.9796	18.4473	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9836	0.9742	0.9560	0.9140	0.8261	0.6469	0.4571	0.4926	0.7364	0.9170	0.9723	0.9862	(94)
Useful gains	603.0848	660.9779	690.7246	682.2832	619.7273	466.6775	317.5879	331.3190	484.4444	571.7813	574.1084	577.8715	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1416.0337	1367.2523	1232.8450	1002.6649	766.5764	498.7922	322.6844	338.4158	545.9541	844.7069	1132.8618	1381.4436	(97)
Space heating kWh													
	604.8340	474.6164	403.3376	230.6749	109.2558	0.0000	0.0000	0.0000	0.0000	203.0566	402.3025	597.8576	(98a)
Space heating requirement - total per year (kWh/year)												3025.9354	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	604.8340	474.6164	403.3376	230.6749	109.2558	0.0000	0.0000	0.0000	0.0000	203.0566	402.3025	597.8576	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3025.9354	
Space heating per m2											(98c) / (4) =	42.9454	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												100.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	604.8340	474.6164	403.3376	230.6749	109.2558	0.0000	0.0000	0.0000	0.0000	203.0566	402.3025	597.8576	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	604.8340	474.6164	403.3376	230.6749	109.2558	0.0000	0.0000	0.0000	0.0000	203.0566	402.3025	597.8576	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.3416	17.9233	16.1379	11.8233	9.1327	7.4615	8.3311	10.8291	14.0659	18.4553	20.8452	22.9625	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3025.9354	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												100.0000	
Water heating fuel used												1900.9365	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
Total electricity for the above, kWh/year												0.0000	(231)
Electricity for lighting (calculated in Appendix L)												180.3094	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5107.1813	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3025.9354	16.4900	498.9768	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1900.9365	16.4900	313.4644	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	180.3094	16.4900	29.7330	(250)
Additional standing charges			0.0000	(251)
Total energy cost			842.1742	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.6259	(257)
SAP value		57.4347	
SAP rating (Section 12)		57	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3025.9354	0.1551	469.4597	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1900.9365	0.1412	268.4125	(264)
Space and water heating			737.8722	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	180.3094	0.1443	26.0242 (268)
Total CO2, kg/year			763.8964 (272)
CO2 emissions per m2			10.8400 (273)
EI value			91.1344
EI rating			91 (274)
EI band			B

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600	(1b)	x 2.1200	(2b) =	149.3752	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		149.3752	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8839 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9016	0.8828	0.8640	0.7889	0.7701	0.6950	0.6950	0.6950	0.6950	0.7889	0.8077	0.8452	(22b)
Effective ac	0.9064	0.8897	0.8733	0.8112	0.7965	0.7415	0.7415	0.7415	0.7415	0.8112	0.8262	0.8572	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Corridor Wall	16.8700	2.1000	14.7700	0.1800	2.6586			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			115.1700					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.0735			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		23.0340 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	53.1075 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.6806	43.8545	43.0459	39.9852	39.2635	36.5506	36.5506	36.5506	36.5506	39.9852	40.7243	42.2546	(38)
Heat transfer coeff	97.7880	96.9620	96.1533	93.0926	92.3709	89.6581	89.6581	89.6581	89.6581	93.0926	93.8317	95.3621	(39)
Average = Sum(39)m / 12 =												93.1071	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3879	1.3761	1.3647	1.3212	1.3110	1.2725	1.2725	1.2725	1.2725	1.3212	1.3317	1.3534	(40)
HLP (average)												1.3214	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.2572 (42)
Hot water usage for mixer showers		

	69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760 (42a)
Hot water usage for baths												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses												
	37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464 (42c)
Average daily hot water use (litres/day)												98.6159 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	
Distribution loss (46)m = 0.15 x (45)m													
	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
										Total per year (kWh/year) = Sum(64)m =		1900.9365	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	74.4599	65.8756	70.0685	61.8300	60.0857	54.3084	53.7263	55.7695	56.2810	62.5599	66.2781	73.6776	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	25.5247	22.6708	18.4371	13.9581	10.4338	8.8087	9.5181	12.3720	16.6056	21.0847	24.6089	26.2341	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	296.0721	299.1444	291.4023	274.9202	254.1147	234.5603	221.4969	218.4246	226.1667	242.6487	263.4543	283.0086	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)
Water heating gains (Table 5)													
	100.0805	98.0291	94.1781	85.8750	80.7604	75.4283	72.2127	74.9589	78.1681	84.0859	92.0529	99.0290	(72)
Total internal gains													
	517.6228	515.7898	499.9630	470.6988	441.2544	414.7428	399.1732	401.7010	416.8859	443.7647	476.0616	504.2171	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	33.9635	0.7600	0.8000	0.7700	71.2655	(77)
Southwest	1.1800	33.9635	0.7600	0.8000	0.7700	16.8862	(79)

Solar gains	88.1517	153.6307	220.2507	279.4510	307.2810	311.2559	290.9564	262.3145	240.9953	177.0586	107.4518	77.8343	(83)
Total gains	605.7744	669.4205	720.2137	750.1498	748.5354	725.9987	690.1295	664.0155	657.8812	620.8233	583.5134	582.0515	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	50.0374	50.4636	50.8880	52.5611	52.9718	54.5746	54.5746	54.5746	54.5746	52.5611	52.1471	51.3103	
alpha	4.3358	4.3642	4.3925	4.5041	4.5315	4.6383	4.6383	4.6383	4.6383	4.5041	4.4765	4.4207	
util living area													
	0.9906	0.9846	0.9713	0.9368	0.8594	0.7068	0.5742	0.6041	0.7964	0.9452	0.9830	0.9920	(86)
MIT	19.5507	19.7246	20.0111	20.4024	20.7220	20.9231	20.9760	20.9699	20.8591	20.4511	19.9792	19.5527	(87)
Th 2	19.7727	19.7817	19.7905	19.8243	19.8323	19.8625	19.8625	19.8625	19.8625	19.8243	19.8161	19.7992	(88)
util rest of house													
	0.9874	0.9795	0.9613	0.9134	0.8050	0.6064	0.4437	0.4725	0.7115	0.9202	0.9762	0.9893	(89)
MIT 2	18.1340	18.3601	18.7264	19.2314	19.6029	19.8193	19.8544	19.8517	19.7697	19.2977	18.7087	18.1547	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	18.5399	18.7511	19.0945	19.5670	19.9236	20.1356	20.1758	20.1721	20.0818	19.6282	19.0728	18.5553	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5399	18.7511	19.0945	19.5670	19.9236	20.1356	20.1758	20.1721	20.0818	19.6282	19.0728	18.5553	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9828	0.9734	0.9536	0.9071	0.8099	0.6324	0.4812	0.5102	0.7298	0.9149	0.9703	0.9853	(94)
Useful gains	595.3779	651.6378	686.8148	680.4837	606.2361	459.1433	332.0734	338.7648	480.1481	568.0084	566.1933	573.4926	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)

Heat loss rate W

1353.3789	1313.9386	1191.7756	974.3983	731.9113	487.3463	338.5272	347.1637	536.3196	831.1533	1085.8926	1330.8065	(97)

Space heating kWh

563.9528	445.0661	375.6908	211.6185	93.5023	0.0000	0.0000	0.0000	0.0000	195.7798	374.1835	563.4415	(98a)

Space heating requirement - total per year (kWh/year) 2823.2352

Solar heating kWh

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

563.9528	445.0661	375.6908	211.6185	93.5023	0.0000	0.0000	0.0000	0.0000	195.7798	374.1835	563.4415	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 2823.2352

Space heating per m2 (98c) / (4) = 40.0686 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)
Fraction of space heat from main system(s) 1.0000 (202)
Efficiency of main space heating system 1 (in %) 100.0000 (206)
Efficiency of main space heating system 2 (in %) 0.0000 (207)
Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	563.9528	445.0661	375.6908	211.6185	93.5023	0.0000	0.0000	0.0000	0.0000	195.7798	374.1835	563.4415	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	563.9528	445.0661	375.6908	211.6185	93.5023	0.0000	0.0000	0.0000	0.0000	195.7798	374.1835	563.4415	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	192.5573	169.7768	179.3500	155.5850	149.3267	132.9635	130.2005	136.3454	138.8963	156.7678	168.9628	190.2044	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	22.3416	17.9233	16.1379	11.8233	9.1327	7.4615	8.3311	10.8291	14.0659	18.4553	20.8452	22.9625	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year
Space heating fuel - main system 1 2823.2352 (211)
Space heating fuel - main system 2 0.0000 (213)
Space heating fuel - secondary 0.0000 (215)
Efficiency of water heater 100.0000
Water heating fuel used 1900.9365 (219)
Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:
Total electricity for the above, kWh/year 0.0000 (231)
Electricity for lighting (calculated in Appendix L) 180.3094 (232)

Energy saving/generation technologies (Appendices M ,N and Q)
PV generation 0.0000 (233)
Wind generation 0.0000 (234)
Hydro-electric generation (Appendix N) 0.0000 (235a)
Electricity generated - Micro CHP (Appendix N) 0.0000 (235)
Appendix Q - special features
Energy saved or generated -0.0000 (236)
Energy used 0.0000 (237)
Total delivered energy for all uses 4904.4811 (238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2823.2352	26.0600	735.7351	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1900.9365	26.0600	495.3841	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	180.3094	26.0600	46.9886	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1278.1078	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2823.2352	0.1552	438.1880	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1900.9365	0.1412	268.4125	(264)
Space and water heating			706.6005	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	180.3094	0.1443	26.0242	(268)
Total CO2, kg/year			732.6247	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2823.2352	1.5746	4445.5308	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1900.9365	1.5221	2893.4565	(278)
Space and water heating			7338.9873	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	180.3094	1.5338	276.5646	(282)
Total Primary energy kWh/year			7615.5519	(286)

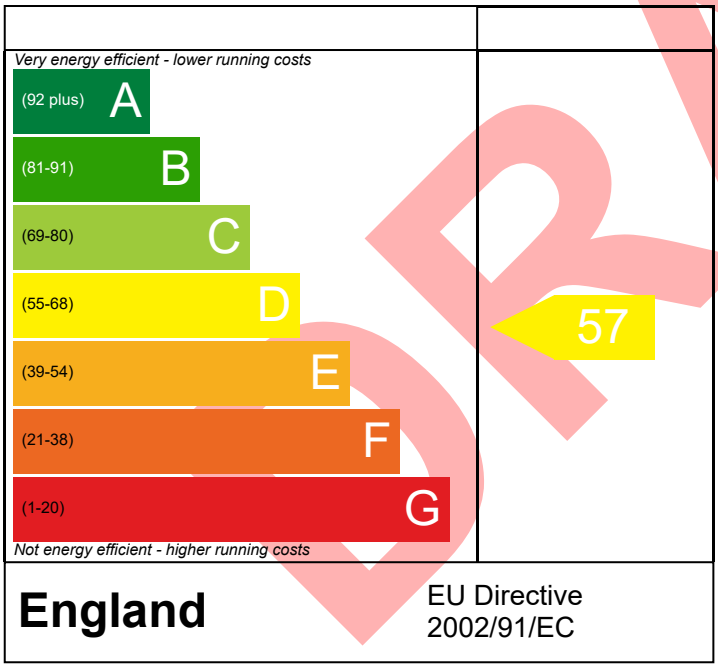
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	70.46 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

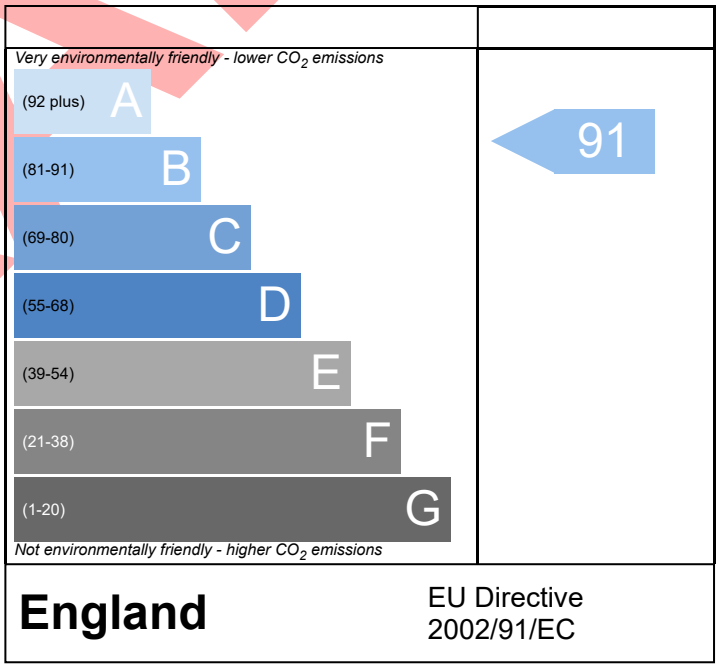
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

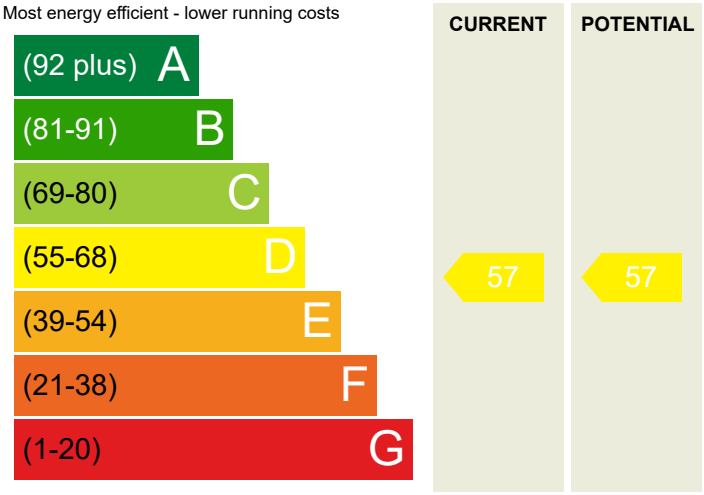
Energy Report

Dwelling Address	
Reference	Apt. 10-Apt. 10
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

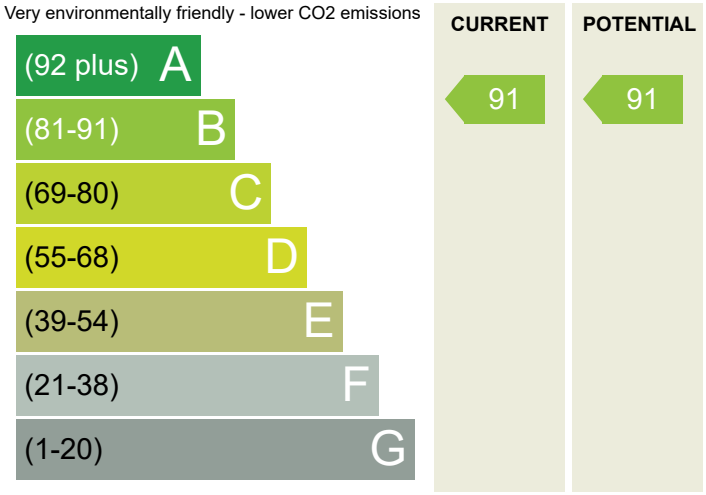
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

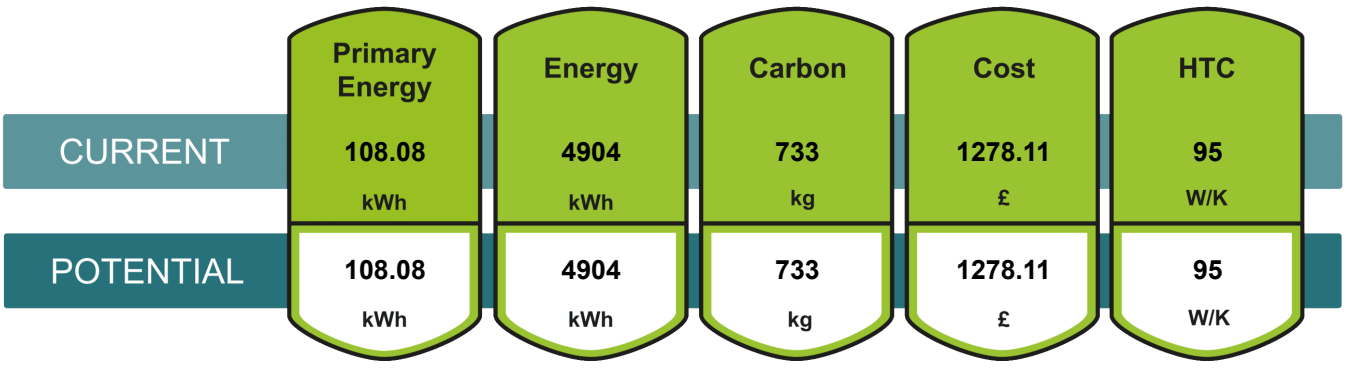
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.21 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£47	£47	
Heating	£736	£736	
Hot Water	£495	£495	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1278	£1278	

Estimated energy use and potential savings

Space Heating
2823
kWh per year

Water Heating
1901
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 10	Issued on Date	01/10/2024
Assessment Reference	Apt. 10	Prop Type Ref	Detached Flat
Property			

SAP Rating	57 D	DER	11.13	TER	
Environmental	91 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.73	DFEE	52.35	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	115.51	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	10.89	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	16.87	m²	

Description	Dormer Wall 1		
Type	Timber Frame		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	15.30	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	37.11	m²	

Description	Dormer Roof 1		
Type	External Flat Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	13.92	m²	

Description	Slope Roof 1		
Type	External Slope Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	21.08	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SE1	New Glazing	Dormer Wall 1	South East	4.98
D NW	New Door	Corridor Wall	North West	2.10

W SW1	New Glazing	External Wall 1	South West	1.18

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System No

Comments

Lighting

No Fixed Lighting	No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	100.00	10.00	1000.00	10

Comments

Main Heating 1

Fuel Type	Electricity	
Winter Efficiency		%
Summer Efficiency		%
Model Name		
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue	No	
Heat Emitter		
Flow Temperature		
Flow Temperature Value		

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder

	Hot Water Cylinder	
Independent Time Control	No	
Cylinder Stat	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day
Pipes insulation		

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 11	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 11	**Prop Type Ref**	
Property			

SAP Rating	57 D	**DER**	12.20	**TER**	
Environmental	91 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.65	**DFEE**	53.94	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	126.85	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	23.57 m	56.89 m²	2.15 m

8.0 Living Area	23.59	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	10.90	9.72	0.00	None	1.18	Enter Gross Area
Corridor Wall	Solid Wall	Other	0.18	0.00	17.56	15.46	0.00	None	2.10	Enter Gross Area
Dormer Wall 1	Timber Frame	Other	0.18	0.00	10.56	7.24	0.00	None	3.32	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	26.65	26.65	None	0.00	Enter Gross Area	0.00
Dormer Roof 1	External Flat Roof	Other	0.16	0.00	9.84	9.84	None	0.00	Enter Gross Area	0.00
Slope Roof 1	External Slope Roof	Other	0.16	0.00	22.18	22.18	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	56.89

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)

Summary for Input Data

elmhurst energy

New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NW1	New Glazing	Dormer Wall 1	South East	3.32	0
D NE	New Door	Corridor Wall	North East	2.10	0
W SW1	New Glazing	External Wall 1	South West	1.18	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	100.00	10.00	1000.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Electricity	
SAP Code	691	
Controls SAP Code	2603	
Delayed Start Stat	No	
HETAS approved System	No	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

Summary for Input Data

elmhurst energy

27.0 Secondary Heating	None
28.0 Water Heating	
Water Heating	Independent
SAP Code	903
Fuel Type	Electricity
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 11	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 11	**Prop Type Ref**	
Property			

SAP Rating	57 D	**DER**	12.20	**TER**	
Environmental	91 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.65	**DFEE**	53.94	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	126.85	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b)	x 2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	122.3135	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9135	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9900	0.9706	0.9512	0.8541	0.8347	0.7377	0.7377	0.7183	0.7765	0.8347	0.8735	0.9124	(22b)
Effective ac	0.9901	0.9710	0.9524	0.8648	0.8484	0.7721	0.7721	0.7579	0.8015	0.8484	0.8815	0.9162	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Corridor Wall	17.5600	2.1000	15.4600	0.1800	2.7828			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			97.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.2951			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.5380	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	44.8331	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.9627	39.1946	38.4417	34.9053	34.2436	31.1635	31.1635	30.5932	32.3499	34.2436	35.5821	36.9815	(38)

Heat transfer coeff

	84.7958	84.0277	83.2748	79.7384	79.0767	75.9967	75.9967	75.4263	77.1831	79.0767	80.4152	81.8146 (39)
Average = Sum(39)m / 12 =												79.7352

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4905	1.4770	1.4638	1.4016	1.3900	1.3359	1.3359	1.3258	1.3567	1.3900	1.4135	1.4381	(40)
HLP (average)												1.4016	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8925 (42)
Hot water usage for mixer showers												
	62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051 (42a)
Hot water usage for baths												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses												
	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109 (42c)
Average daily hot water use (litres/day)												88.8608 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m													
	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
										Total per year (kWh/year) = Sum(64)m =		1738.8922	(64)
12Total per year (kWh/year)												1739	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.8607	60.9546	64.9037	57.4231	55.9084	50.6455	50.1780	52.0191	52.4230	58.1378	61.4312	68.1557	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	98.1378	108.6526	98.1378	101.4091	98.1378	101.4091	98.1378	98.1378	101.4091	98.1378	101.4091	98.1378	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	165.0411	166.7537	162.4380	153.2503	141.6526	130.7523	123.4702	121.7576	126.0734	135.2610	146.8588	157.7591	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	92.5546	90.7062	87.2361	79.7544	75.1457	70.3410	67.4435	69.9181	72.8098	78.1422	85.3211	91.6071	(72)
Total internal gains													
	407.1208	417.4997	399.1991	385.8010	366.3233	353.8896	340.4388	341.2007	351.6794	362.9282	384.9762	398.8912	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	36.7938	0.7600	0.8000	0.7700	51.4695	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	69.7629	118.8320	162.5911	201.4583	225.6500	224.0183	215.9775	197.9293	176.0518	131.3347	83.5598	59.7025 (83)
Total gains	476.8837	536.3317	561.7902	587.2592	591.9733	577.9078	556.4163	539.1301	527.7312	494.2628	468.5361	458.5937 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	46.5907	47.0166	47.4417	49.5457	49.9603	51.9851	51.9851	52.3782	51.1860	49.9603	49.1287	48.2884
alpha	4.1060	4.1344	4.1628	4.3030	4.3307	4.4657	4.4657	4.4919	4.4124	4.3307	4.2752	4.2192
util living area												
	0.9924	0.9867	0.9774	0.9502	0.8888	0.7405	0.5747	0.6088	0.8189	0.9529	0.9857	0.9935 (86)
MIT	19.3272	19.5353	19.8265	20.2670	20.6222	20.8935	20.9733	20.9658	20.8177	20.3656	19.8207	19.3549 (87)
Th 2	19.6946	19.7048	19.7148	19.7621	19.7710	19.8129	19.8129	19.8207	19.7967	19.7710	19.7530	19.7342 (88)

util rest of house													
	0.9898	0.9822	0.9692	0.9307	0.8416	0.6398	0.4325	0.4693	0.7342	0.9305	0.9801	0.9913	(89)
MIT 2	17.7973	18.0681	18.4432	19.0233	19.4467	19.7510	19.8047	19.8089	19.6750	19.1564	18.4649	17.8589	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	18.4316	18.6765	19.0168	19.5390	19.9341	20.2248	20.2893	20.2886	20.1488	19.6578	19.0271	18.4792	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4316	18.6765	19.0168	19.5390	19.9341	20.2248	20.2893	20.2886	20.1488	19.6578	19.0271	18.4792	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9862	0.9773	0.9633	0.9263	0.8489	0.6777	0.4919	0.5273	0.7621	0.9278	0.9755	0.9882	(94)
Useful gains	470.2930	524.1370	541.1786	543.9797	502.5476	391.6208	273.6973	284.3035	402.1924	458.6008	457.0687	453.1638	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1198.3042	1157.6058	1042.3355	848.3369	651.1272	427.4634	280.3717	293.3054	466.8661	716.2587	959.1198	1168.2474	(97)
Space heating kWh	541.6403	425.6910	372.8607	219.1372	110.5432	0.0000	0.0000	0.0000	0.0000	191.6975	361.4768	532.0222	(98a)
Space heating requirement - total per year (kWh/year)												2755.0689	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	541.6403	425.6910	372.8607	219.1372	110.5432	0.0000	0.0000	0.0000	0.0000	191.6975	361.4768	532.0222	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2755.0689	
Space heating per m2											(98c) / (4) =	48.4280	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	541.6403	425.6910	372.8607	219.1372	110.5432	0.0000	0.0000	0.0000	0.0000	191.6975	361.4768	532.0222	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	541.6403	425.6910	372.8607	219.1372	110.5432	0.0000	0.0000	0.0000	0.0000	191.6975	361.4768	532.0222	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.9740	15.2217	13.7054	10.0412	7.7561	6.3368	7.0754	9.1968	11.9458	15.6735	17.7032	19.5014	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2755.0689	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1738.8922	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	153.1313	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4647.0924	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year

Space heating - main system 1	2755.0689	0.1549	426.7474	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1738.8922	0.1412	245.4671	(264)
Space and water heating			672.2146	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	153.1313	0.1443	22.1016	(268)
Total CO2, kg/year			694.3161	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			12.2000	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2755.0689	1.5735	4334.9942	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1738.8922	1.5220	2646.5631	(278)
Space and water heating			6981.5573	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	153.1313	1.5338	234.8779	(282)
Total Primary energy kWh/year			7216.4352	(286)
Dwelling Primary energy Rate (DPER)			126.8500	(287)

Full SAP Calculation Printout

Property Reference	Apt. 11	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 11	**Prop Type Ref**	
Property			

SAP Rating	57 D	**DER**	12.20	**TER**	
Environmental	91 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.65	**DFEE**	53.94	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	126.85	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b)	x 2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	122.3135	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9135	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9900	0.9706	0.9512	0.8541	0.8347	0.7377	0.7377	0.7183	0.7765	0.8347	0.8735	0.9124	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9901	0.9710	0.9524	0.8648	0.8484	0.7721	0.7721	0.7579	0.8015	0.8484	0.8815	0.9162	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Corridor Wall	17.5600	2.1000	15.4600	0.1800	2.7828			(29a)
Dormer Wall 1	10.5600	3.2000	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			97.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.2951			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.5380	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	44.8331	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.9627	39.1946	38.4417	34.9053	34.2436	31.1635	31.1635	30.5932	32.3499	34.2436	35.5821	36.9815	(38)
Heat transfer coeff													
	84.7958	84.0277	83.2748	79.7384	79.0767	75.9967	75.9967	75.4263	77.1831	79.0767	80.4152	81.8146	(39)
Average = Sum(39)m / 12 =												79.7352	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4905	1.4770	1.4638	1.4016	1.3900	1.3359	1.3359	1.3258	1.3567	1.3900	1.4135	1.4381	(40)
HLP (average)												1.4016	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8925	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	24.1837	23.8245	23.3187	22.3862	21.6879	20.9136	20.4954	20.9976	21.5444	22.3730	23.3247	24.1019	(42b)
Hot water usage for other uses													
	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109	(42c)
Average daily hot water use (litres/day)												53.3411	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	58.1946	56.5986	54.8561	52.6868	50.7517	48.7407	48.3225	50.0615	51.8451	53.9103	56.0989	58.1128	(44)
Energy conte	92.1660	80.5957	84.3118	72.1256	68.3216	59.9324	58.4418	61.9865	63.9301	73.1558	79.9231	90.9906	(45)
Energy content (annual)											Total = Sum(45)m =	885.8811	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	78.3411	68.5064	71.6650	61.3068	58.0734	50.9425	49.6756	52.6886	54.3406	62.1825	67.9346	77.3420	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	78.3411	68.5064	71.6650	61.3068	58.0734	50.9425	49.6756	52.6886	54.3406	62.1825	67.9346	77.3420	(64)
										Total per year (kWh/year) = Sum(64)m =		752.9990	(64)
12Total per year (kWh/year)												753	(64)
Electric shower(s)													
	44.8068	39.9232	43.5947	41.6018	42.3825	40.4288	41.7764	42.3825	41.6018	43.5947	42.7749	44.8068	(64a)
							Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					509.6749	(64a)
Heat gains from water heating, kWh/month													
	30.7870	27.1074	28.8149	25.7271	25.1140	22.8428	22.8630	23.7678	23.9856	26.4443	27.6774	30.5372	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	98.1378	108.6526	98.1378	101.4091	98.1378	101.4091	98.1378	98.1378	101.4091	98.1378	101.4091	98.1378	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	165.0411	166.7537	162.4380	153.2503	141.6526	130.7523	123.4702	121.7576	126.0734	135.2610	146.8588	157.7591	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	41.3803	40.3384	38.7297	35.7322	33.7553	31.7261	30.7298	31.9459	33.3134	35.5434	38.4408	41.0446	(72)
Total internal gains													
	355.9465	367.1319	350.6928	341.7788	324.9329	315.2747	303.7251	303.2286	312.1830	320.3294	338.0959	348.3287	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	36.7938	0.7600	0.8000	0.7700	51.4695	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	69.7629	118.8320	162.5911	201.4583	225.6500	224.0183	215.9775	197.9293	176.0518	131.3347	83.5598	59.7025	(83)
Total gains	425.7094	485.9639	513.2839	543.2370	550.5830	539.2930	519.7026	501.1579	488.2348	451.6641	421.6557	408.0312	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	46.5907	47.0166	47.4417	49.5457	49.9603	51.9851	51.9851	52.3782	51.1860	49.9603	49.1287	48.2884	
alpha	4.1060	4.1344	4.1628	4.3030	4.3307	4.4657	4.4657	4.4919	4.4124	4.3307	4.2752	4.2192	
util living area													
	0.9950	0.9907	0.9835	0.9613	0.9087	0.7725	0.6082	0.6452	0.8488	0.9649	0.9903	0.9958	(86)
MIT	19.2390	19.4503	19.7475	20.2025	20.5756	20.8728	20.9667	20.9569	20.7855	20.3021	19.7410	19.2667	(87)
Th 2	19.6946	19.7048	19.7148	19.7621	19.7710	19.8129	19.8129	19.8207	19.7967	19.7710	19.7530	19.7342	(88)
util rest of house													
	0.9932	0.9874	0.9773	0.9453	0.8671	0.6742	0.4611	0.5018	0.7702	0.9472	0.9863	0.9944	(89)

MIT 2	18.1287	18.3458	18.6474	19.1268	19.4807	19.7535	19.8046	19.8088	19.6811	19.2341	18.6713	18.1852	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	18.5891	18.8038	19.1036	19.5728	19.9347	20.2177	20.2865	20.2849	20.1390	19.6770	19.1149	18.6337	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5891	18.8038	19.1036	19.5728	19.9347	20.2177	20.2865	20.2849	20.1390	19.6770	19.1149	18.6337	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9911	0.9843	0.9733	0.9422	0.8737	0.7111	0.5228	0.5617	0.7959	0.9455	0.9835	0.9926	(94)
Useful gains	421.9251	478.3280	499.5900	511.8648	481.0212	383.4730	271.6930	281.4928	388.5637	427.0558	414.7069	405.0040	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1211.6561	1168.3032	1049.5584	851.0355	651.1728	426.9237	280.1608	293.0202	466.1113	717.7775	966.1793	1180.8841	(97)
Space heating kWh	587.5598	463.6633	409.1765	244.2029	126.5928	0.0000	0.0000	0.0000	0.0000	216.2969	397.0601	577.2548	(98a)
Space heating requirement - total per year (kWh/year)												3021.8071	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	587.5598	463.6633	409.1765	244.2029	126.5928	0.0000	0.0000	0.0000	0.0000	216.2969	397.0601	577.2548	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3021.8071	
Space heating per m2											(98c) / (4) =	53.1167	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	714.3685	562.3752	573.2396	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7261	0.8174	0.7952	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	518.7282	459.6687	455.8503	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	583.4020	562.8302	543.1769	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	46.5651	76.7521	64.9710	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	11.6413	19.1880	16.2427	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												47.0721	(107)
Energy for space heating												53.1167	(99)
Energy for space cooling												0.8274	(108)
Total												53.9441	(109)
Fabric Energy Efficiency (DFEE)												53.9	(109)

Full SAP Calculation Printout

Property Reference	Apt. 11	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 11	**Prop Type Ref**	
Property			

SAP Rating	57 D	**DER**	12.20	**TER**	
Environmental	91 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	0.65	**DFEE**	53.94	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	126.85	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b)	x 2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	122.3135	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9135	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9900	0.9706	0.9512	0.8541	0.8347	0.7377	0.7377	0.7183	0.7765	0.8347	0.8735	0.9124	(22b)
Effective ac	0.9901	0.9710	0.9524	0.8648	0.8484	0.7721	0.7721	0.7579	0.8015	0.8484	0.8815	0.9162	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Corridor Wall	17.5600	2.1000	15.4600	0.1800	2.7828			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			97.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.2951			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.5380	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	44.8331	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.9627	39.1946	38.4417	34.9053	34.2436	31.1635	31.1635	30.5932	32.3499	34.2436	35.5821	36.9815	(38)

Heat transfer coeff

	84.7958	84.0277	83.2748	79.7384	79.0767	75.9967	75.9967	75.4263	77.1831	79.0767	80.4152	81.8146 (39)
Average = Sum(39)m / 12 =												79.7352

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4905	1.4770	1.4638	1.4016	1.3900	1.3359	1.3359	1.3258	1.3567	1.3900	1.4135	1.4381	(40)
HLP (average)												1.4016	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8925 (42)
Hot water usage for mixer showers												
	62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051 (42a)
Hot water usage for baths												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses												
	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109 (42c)
Average daily hot water use (litres/day)												88.8608 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m													
	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
										Total per year (kWh/year) = Sum(64)m =		1738.8922	(64)
12Total per year (kWh/year)												1739	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.8607	60.9546	64.9037	57.4231	55.9084	50.6455	50.1780	52.0191	52.4230	58.1378	61.4312	68.1557	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	98.1378	108.6526	98.1378	101.4091	98.1378	101.4091	98.1378	98.1378	101.4091	98.1378	101.4091	98.1378	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	165.0411	166.7537	162.4380	153.2503	141.6526	130.7523	123.4702	121.7576	126.0734	135.2610	146.8588	157.7591	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	92.5546	90.7062	87.2361	79.7544	75.1457	70.3410	67.4435	69.9181	72.8098	78.1422	85.3211	91.6071	(72)
Total internal gains													
	407.1208	417.4997	399.1991	385.8010	366.3233	353.8896	340.4388	341.2007	351.6794	362.9282	384.9762	398.8912	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	36.7938	0.7600	0.8000	0.7700	51.4695	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	69.7629	118.8320	162.5911	201.4583	225.6500	224.0183	215.9775	197.9293	176.0518	131.3347	83.5598	59.7025 (83)
Total gains	476.8837	536.3317	561.7902	587.2592	591.9733	577.9078	556.4163	539.1301	527.7312	494.2628	468.5361	458.5937 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	46.5907	47.0166	47.4417	49.5457	49.9603	51.9851	51.9851	52.3782	51.1860	49.9603	49.1287	48.2884
alpha	4.1060	4.1344	4.1628	4.3030	4.3307	4.4657	4.4657	4.4919	4.4124	4.3307	4.2752	4.2192
util living area												
	0.9924	0.9867	0.9774	0.9502	0.8888	0.7405	0.5747	0.6088	0.8189	0.9529	0.9857	0.9935 (86)
MIT	19.3272	19.5353	19.8265	20.2670	20.6222	20.8935	20.9733	20.9658	20.8177	20.3656	19.8207	19.3549 (87)
Th 2	19.6946	19.7048	19.7148	19.7621	19.7710	19.8129	19.8129	19.8207	19.7967	19.7710	19.7530	19.7342 (88)

util rest of house													
	0.9898	0.9822	0.9692	0.9307	0.8416	0.6398	0.4325	0.4693	0.7342	0.9305	0.9801	0.9913	(89)
MIT 2	17.7973	18.0681	18.4432	19.0233	19.4467	19.7510	19.8047	19.8089	19.6750	19.1564	18.4649	17.8589	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	18.4316	18.6765	19.0168	19.5390	19.9341	20.2248	20.2893	20.2886	20.1488	19.6578	19.0271	18.4792	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4316	18.6765	19.0168	19.5390	19.9341	20.2248	20.2893	20.2886	20.1488	19.6578	19.0271	18.4792	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9862	0.9773	0.9633	0.9263	0.8489	0.6777	0.4919	0.5273	0.7621	0.9278	0.9755	0.9882	(94)
Useful gains	470.2930	524.1370	541.1786	543.9797	502.5476	391.6208	273.6973	284.3035	402.1924	458.6008	457.0687	453.1638	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1198.3042	1157.6058	1042.3355	848.3369	651.1272	427.4634	280.3717	293.3054	466.8661	716.2587	959.1198	1168.2474	(97)
Space heating kWh	541.6403	425.6910	372.8607	219.1372	110.5432	0.0000	0.0000	0.0000	0.0000	191.6975	361.4768	532.0222	(98a)
Space heating requirement - total per year (kWh/year)												2755.0689	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	541.6403	425.6910	372.8607	219.1372	110.5432	0.0000	0.0000	0.0000	0.0000	191.6975	361.4768	532.0222	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2755.0689	
Space heating per m2											(98c) / (4) =	48.4280	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	541.6403	425.6910	372.8607	219.1372	110.5432	0.0000	0.0000	0.0000	0.0000	191.6975	361.4768	532.0222	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	541.6403	425.6910	372.8607	219.1372	110.5432	0.0000	0.0000	0.0000	0.0000	191.6975	361.4768	532.0222	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.9740	15.2217	13.7054	10.0412	7.7561	6.3368	7.0754	9.1968	11.9458	15.6735	17.7032	19.5014	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2755.0689	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1738.8922	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	153.1313	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4647.0924	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year

Space heating - main system 1	2755.0689	0.1549	426.7474	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1738.8922	0.1412	245.4671	(264)
Space and water heating			672.2146	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	153.1313	0.1443	22.1016	(268)
Total CO2, kg/year			694.3161	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			12.2000	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2755.0689	1.5735	4334.9942	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1738.8922	1.5220	2646.5631	(278)
Space and water heating			6981.5573	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	153.1313	1.5338	234.8779	(282)
Total Primary energy kWh/year			7216.4352	(286)
Dwelling Primary energy Rate (DPER)			126.8500	(287)

Full SAP Calculation Printout

Property Reference	Apt. 11	Issued on Date	01/10/2024
Assessment Reference	Apt. 11	Prop Type Ref	
Property			

SAP Rating	57 D	DER	12.20	TER	
Environmental	91 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.65	DFEE	53.94	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	126.85	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b)	x 2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		122.3135	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.9135 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9900	0.9706	0.9512	0.8541	0.8347	0.7377	0.7377	0.7183	0.7765	0.8347	0.8735	0.9124	(22b)
Effective ac	0.9901	0.9710	0.9524	0.8648	0.8484	0.7721	0.7721	0.7579	0.8015	0.8484	0.8815	0.9162	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Corridor Wall	17.5600	2.1000	15.4600	0.1800	2.7828			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			97.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.2951			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		19.5380 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	44.8331 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.9627	39.1946	38.4417	34.9053	34.2436	31.1635	31.1635	30.5932	32.3499	34.2436	35.5821	36.9815	(38)

Heat transfer coeff

	84.7958	84.0277	83.2748	79.7384	79.0767	75.9967	75.9967	75.4263	77.1831	79.0767	80.4152	81.8146 (39)
Average = Sum(39)m / 12 =												79.7352

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4905	1.4770	1.4638	1.4016	1.3900	1.3359	1.3359	1.3258	1.3567	1.3900	1.4135	1.4381	(40)
HLP (average)												1.4016	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8925 (42)

Hot water usage for mixer showers

	62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051 (42a)

Hot water usage for baths

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)

Hot water usage for other uses

	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109 (42c)

Average daily hot water use (litres/day) 88.8608 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m													
	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
										Total per year (kWh/year) = Sum(64)m =		1738.8922	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.8607	60.9546	64.9037	57.4231	55.9084	50.6455	50.1780	52.0191	52.4230	58.1378	61.4312	68.1557	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.6773	19.2536	15.6581	11.8542	8.8611	7.4809	8.0834	10.5071	14.1027	17.9066	20.8996	22.2798	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	246.3300	248.8862	242.4448	228.7319	211.4217	195.1527	184.2839	181.7278	188.1692	201.8821	219.1922	235.4613	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	92.5546	90.7062	87.2361	79.7544	75.1457	70.3410	67.4435	69.9181	72.8098	78.1422	85.3211	91.6071	(72)
Total internal gains													
	446.6590	444.9430	431.4360	406.4374	381.5256	359.0716	345.9079	348.2500	361.1786	384.0278	411.5100	435.4452	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	36.7938	0.7600	0.8000	0.7700	51.4695	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	69.7629	118.8320	162.5911	201.4583	225.6500	224.0183	215.9775	197.9293	176.0518	131.3347	83.5598	59.7025	(83)
Total gains	516.4219	563.7749	594.0271	607.8956	607.1756	583.0899	561.8854	546.1794	537.2304	515.3625	495.0698	495.1477	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	46.5907	47.0166	47.4417	49.5457	49.9603	51.9851	51.9851	52.3782	51.1860	49.9603	49.1287	48.2884	
alpha	4.1060	4.1344	4.1628	4.3030	4.3307	4.4657	4.4657	4.4919	4.4124	4.3307	4.2752	4.2192	
util living area													
	0.9898	0.9842	0.9728	0.9445	0.8812	0.7363	0.5699	0.6023	0.8117	0.9462	0.9826	0.9913	(86)
MIT	19.3945	19.5809	19.8778	20.2961	20.6382	20.8960	20.9742	20.9672	20.8247	20.3956	19.8649	19.4180	(87)
Th 2	19.6946	19.7048	19.7148	19.7621	19.7710	19.8129	19.8129	19.8207	19.7967	19.7710	19.7530	19.7342	(88)
util rest of house													

	0.9865	0.9789	0.9631	0.9233	0.8321	0.6353	0.4285	0.4637	0.7257	0.9214	0.9759	0.9885	(89)
MIT 2	17.8825	18.1254	18.5064	19.0572	19.4629	19.7527	19.8050	19.8095	19.6806	19.1910	18.5201	17.9389	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	18.5094	18.7289	19.0750	19.5710	19.9502	20.2268	20.2898	20.2895	20.1550	19.6905	19.0777	18.5522	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5094	18.7289	19.0750	19.5710	19.9502	20.2268	20.2898	20.2895	20.1550	19.6905	19.0777	18.5522	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9821	0.9735	0.9568	0.9192	0.8404	0.6734	0.4876	0.5214	0.7544	0.9193	0.9709	0.9847	(94)
Useful gains	507.1978	548.8179	568.3826	558.8002	510.2559	392.6518	273.9633	284.7638	405.2829	473.7842	480.6574	487.5716	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1204.8992	1162.0110	1047.1831	850.8859	652.4028	427.6167	280.4117	293.3736	467.3450	718.8473	963.1933	1174.2220	(97)
Space heating kWh													
	519.0898	412.0658	356.2276	210.3017	105.7572	0.0000	0.0000	0.0000	0.0000	182.3269	347.4258	510.8679	(98a)
Space heating requirement - total per year (kWh/year)												2644.0628	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	519.0898	412.0658	356.2276	210.3017	105.7572	0.0000	0.0000	0.0000	0.0000	182.3269	347.4258	510.8679	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2644.0628	
Space heating per m2											(98c) / (4) =	46.4768	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
Fraction of space heat from main system(s)	1.0000 (202)
Efficiency of main space heating system 1 (in %)	100.0000 (206)
Efficiency of main space heating system 2 (in %)	0.0000 (207)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	519.0898	412.0658	356.2276	210.3017	105.7572	0.0000	0.0000	0.0000	0.0000	182.3269	347.4258	510.8679	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	519.0898	412.0658	356.2276	210.3017	105.7572	0.0000	0.0000	0.0000	0.0000	182.3269	347.4258	510.8679	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.9740	15.2217	13.7054	10.0412	7.7561	6.3368	7.0754	9.1968	11.9458	15.6735	17.7032	19.5014	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year	
Space heating fuel - main system 1	2644.0628 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	100.0000
Water heating fuel used	1738.8922 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
Total electricity for the above, kWh/year	0.0000 (231)
Electricity for lighting (calculated in Appendix L)	153.1313 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	4536.0863 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2644.0628	16.4900	436.0059	(240)

Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1738.8922	16.4900	286.7433	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	153.1313	16.4900	25.2514	(250)
Additional standing charges			0.0000	(251)
Total energy cost			748.0006	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	2.6429	(257)
SAP value		57.1594	
SAP rating (Section 12)		57	(258)
SAP band		D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2644.0628	0.1549	409.6073	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1738.8922	0.1412	245.4671	(264)
Space and water heating			655.0745	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	153.1313	0.1443	22.1016	(268)
Total CO2, kg/year			677.1760	(272)
CO2 emissions per m2			11.9000	(273)
EI value			91.0942	
EI rating			91	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b) x	2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	122.3135	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9135	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9318	0.9124	0.8930	0.8153	0.7959	0.7183	0.7183	0.7183	0.7183	0.8153	0.8347	0.8735	(22b)
Effective ac	0.9341	0.9162	0.8987	0.8324	0.8167	0.7579	0.7579	0.7579	0.7579	0.8324	0.8484	0.8815	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Corridor Wall	17.5600	2.1000	15.4600	0.1800	2.7828			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)

External Roof 1	26.6500	26.6500	0.1600	4.2640		(30)
Dormer Roof 1	9.8400	9.8400	0.1600	1.5744		(30)
Slope Roof 1	22.1800	22.1800	0.1600	3.5488		(30)
Total net area of external elements Aum(A, m2)		97.6900				(31)
Fabric heat loss, W/K = Sum (A x U)		(26)...(30) + (32) =		25.2951		(33)
Party Floor 1		56.8900				(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		19.5380 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	44.8331 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	37.7040	36.9815	36.2742	33.5972	32.9660	30.5932	30.5932	30.5932	30.5932	33.5972	34.2436	35.5821	(38)
Heat transfer coeff	82.5371	81.8146	81.1073	78.4303	77.7991	75.4263	75.4263	75.4263	75.4263	78.4303	79.0767	80.4152	(39)
Average = Sum(39)m / 12 =												78.4430	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4508	1.4381	1.4257	1.3786	1.3675	1.3258	1.3258	1.3258	1.3258	1.3786	1.3900	1.4135	(40)
HLP (average)												1.3789	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8925	(42)
Hot water usage for mixer showers	62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109	(42c)
Average daily hot water use (litres/day)												88.8608	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
									Total per year (kWh/year) = Sum(64)m =			1738.8922	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	68.8607	60.9546	64.9037	57.4231	55.9084	50.6455	50.1780	52.0191	52.4230	58.1378	61.4312	68.1557	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	21.6773	19.2536	15.6581	11.8542	8.8611	7.4809	8.0834	10.5071	14.1027	17.9066	20.8996	22.2798	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	246.3300	248.8862	242.4448	228.7319	211.4217	195.1527	184.2839	181.7278	188.1692	201.8821	219.1922	235.4613	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)	92.5546	90.7062	87.2361	79.7544	75.1457	70.3410	67.4435	69.9181	72.8098	78.1422	85.3211	91.6071	(72)
Total internal gains	446.6590	444.9430	431.4360	406.4374	381.5256	359.0716	345.9079	348.2500	361.1786	384.0278	411.5100	435.4452	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	33.9635	0.7600	0.8000	0.7700	47.5103	(77)
Southwest	1.1800	33.9635	0.7600	0.8000	0.7700	16.8862	(79)

Solar gains	64.3965	112.2302	160.8974	204.1444	224.4748	227.3785	212.5493	191.6259	176.0518	129.3447	78.4956	56.8595	(83)
Total gains	511.0555	557.1732	592.3334	610.5818	606.0003	586.4502	558.4572	539.8759	537.2304	513.3726	490.0056	492.3047	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	47.8657	48.2884	48.7095	50.3720	50.7807	52.3782	52.3782	52.3782	52.3782	50.3720	49.9603	49.1287	
alpha	4.1910	4.2192	4.2473	4.3581	4.3854	4.4919	4.4919	4.4919	4.4919	4.3581	4.3307	4.2752	
util living area	0.9892	0.9835	0.9710	0.9393	0.8680	0.7231	0.5914	0.6188	0.8047	0.9446	0.9811	0.9907	(86)
MIT	19.4997	19.6667	19.9509	20.3492	20.6843	20.9066	20.9695	20.9627	20.8391	20.4159	19.9407	19.5057	(87)
Th 2	19.7246	19.7342	19.7437	19.7798	19.7883	19.8207	19.8207	19.8207	19.8207	19.7798	19.7710	19.7530	(88)
util rest of house	0.9855	0.9779	0.9607	0.9163	0.8143	0.6203	0.4541	0.4813	0.7188	0.9189	0.9736	0.9875	(89)
MIT 2	18.0365	18.2541	18.6181	19.1341	19.5267	19.7680	19.8104	19.8073	19.7145	19.2218	18.6283	18.0633	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	18.6432	18.8399	19.1708	19.6379	20.0067	20.2401	20.2910	20.2864	20.1808	19.7169	19.1725	18.6614	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6432	18.8399	19.1708	19.6379	20.0067	20.2401	20.2910	20.2864	20.1808	19.7169	19.1725	18.6614	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9812	0.9725	0.9546	0.9130	0.8253	0.6596	0.5113	0.5384	0.7480	0.9173	0.9687	0.9837	(94)
Useful gains	501.4521	541.8773	565.4192	557.4658	500.1582	386.8375	285.5115	290.6671	401.8441	470.9014	474.6728	484.2603	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1150.8345	1115.9414	1011.4696	826.4939	622.9137	417.8726	293.4844	300.6807	458.6513	707.1993	923.0217	1130.7509	(97)
Space heating kWh	483.1405	385.7711	331.8615	193.7002	91.3301	0.0000	0.0000	0.0000	0.0000	175.8056	322.8112	480.9890	(98a)
Space heating requirement - total per year (kWh/year)												2465.4093	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	483.1405	385.7711	331.8615	193.7002	91.3301	0.0000	0.0000	0.0000	0.0000	175.8056	322.8112	480.9890	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2465.4093	
Space heating per m2											(98c) / (4) =	43.3364	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11) 0.0000 (201)

Fraction of space heat from main system(s) 1.0000 (202)

Efficiency of main space heating system 1 (in %) 100.0000 (206)

Efficiency of main space heating system 2 (in %) 0.0000 (207)

Efficiency of secondary/supplementary heating system, % 0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	483.1405	385.7711	331.8615	193.7002	91.3301	0.0000	0.0000	0.0000	0.0000	175.8056	322.8112	480.9890	(98)
Space heating efficiency (main heating system 1)	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)	483.1405	385.7711	331.8615	193.7002	91.3301	0.0000	0.0000	0.0000	0.0000	175.8056	322.8112	480.9890	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.9740	15.2217	13.7054	10.0412	7.7561	6.3368	7.0754	9.1968	11.9458	15.6735	17.7032	19.5014	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year

Space heating fuel - main system 1 2465.4093 (211)

Space heating fuel - main system 2 0.0000 (213)

Space heating fuel - secondary 0.0000 (215)

Efficiency of water heater 100.0000

Water heating fuel used 1738.8922 (219)

Space cooling fuel 0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year 0.0000 (231)

Electricity for lighting (calculated in Appendix L) 153.1313 (232)

Energy saving/generation technologies (Appendices M ,N and Q)

PV generation 0.0000 (233)

Wind generation 0.0000 (234)

Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	4357.4329 (238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2465.4093	26.0600	642.4857	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1738.8922	26.0600	453.1553	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	153.1313	26.0600	39.9060	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1135.5470	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2465.4093	0.1550	382.0601	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1738.8922	0.1412	245.4671	(264)
Space and water heating			627.5272	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	153.1313	0.1443	22.1016	(268)
Total CO2, kg/year			649.6288	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2465.4093	1.5737	3879.9105	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1738.8922	1.5220	2646.5631	(278)
Space and water heating			6526.4735	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	153.1313	1.5338	234.8779	(282)
Total Primary energy kWh/year			6761.3514	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 11

Current energy efficiency rating: D 57
Current environmental impact rating: B 91

N	Solar water heating	Not applicable
U	Solar photovoltaic panels	Not applicable
V2	Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: D 57
Potential environmental impact rating: B 91

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£1136	£1136	£0
Space heating	£642	£642	£0
Water heating	£453	£453	£0
Lighting	£40	£40	£0
Total cost of fuels	£1136	£1136	£0
Total cost of uses	£1135	£1135	£0
Delivered energy	77 kWh/m²	77 kWh/m²	0 kWh/m²
Carbon dioxide emissions	0.6 tonnes	0.6 tonnes	0.0 tonnes
CO2 emissions per m²	11 kg/m²	11 kg/m²	0 kg/m²
Primary energy	119 kWh/m²	119 kWh/m²	0 kWh/m²

CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b)	x 2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		122.3135	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.9135 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9900	0.9706	0.9512	0.8541	0.8347	0.7377	0.7377	0.7183	0.7765	0.8347	0.8735	0.9124	(22b)
Effective ac	0.9901	0.9710	0.9524	0.8648	0.8484	0.7721	0.7721	0.7579	0.8015	0.8484	0.8815	0.9162	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Corridor Wall	17.5600	2.1000	15.4600	0.1800	2.7828			(29a)
Dormer Wall 1	10.5600	3.2000	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			97.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.2951			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		19.5380 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	44.8331 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.9627	39.1946	38.4417	34.9053	34.2436	31.1635	31.1635	30.5932	32.3499	34.2436	35.5821	36.9815	(38)
Heat transfer coeff	84.7958	84.0277	83.2748	79.7384	79.0767	75.9967	75.9967	75.4263	77.1831	79.0767	80.4152	81.8146	(39)
Average = Sum(39)m / 12 =												79.7352	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4905	1.4770	1.4638	1.4016	1.3900	1.3359	1.3359	1.3258	1.3567	1.3900	1.4135	1.4381	(40)
HLP (average)												1.4016	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.8925 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109	(42c)

Average daily hot water use (litres/day)		88.8608 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m													
	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)

Water storage loss:

Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
									Total per year (kWh/year) = Sum(64)m =			1738.8922	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.8607	60.9546	64.9037	57.4231	55.9084	50.6455	50.1780	52.0191	52.4230	58.1378	61.4312	68.1557	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.6773	19.2536	15.6581	11.8542	8.8611	7.4809	8.0834	10.5071	14.1027	17.9066	20.8996	22.2798	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	246.3300	248.8862	242.4448	228.7319	211.4217	195.1527	184.2839	181.7278	188.1692	201.8821	219.1922	235.4613	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	92.5546	90.7062	87.2361	79.7544	75.1457	70.3410	67.4435	69.9181	72.8098	78.1422	85.3211	91.6071	(72)
Total internal gains													
	446.6590	444.9430	431.4360	406.4374	381.5256	359.0716	345.9079	348.2500	361.1786	384.0278	411.5100	435.4452	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	36.7938	0.7600	0.8000	0.7700	51.4695	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	69.7629	118.8320	162.5911	201.4583	225.6500	224.0183	215.9775	197.9293	176.0518	131.3347	83.5598	59.7025	(83)
Total gains	516.4219	563.7749	594.0271	607.8956	607.1756	583.0899	561.8854	546.1794	537.2304	515.3625	495.0698	495.1477	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	46.5907	47.0166	47.4417	49.5457	49.9603	51.9851	51.9851	52.3782	51.1860	49.9603	49.1287	48.2884	
alpha	4.1060	4.1344	4.1628	4.3030	4.3307	4.4657	4.4657	4.4919	4.4124	4.3307	4.2752	4.2192	
util living area													
	0.9898	0.9842	0.9728	0.9445	0.8812	0.7363	0.5699	0.6023	0.8117	0.9462	0.9826	0.9913	(86)
MIT	19.3945	19.5809	19.8778	20.2961	20.6382	20.8960	20.9742	20.9672	20.8247	20.3956	19.8649	19.4180	(87)
Th 2	19.6946	19.7048	19.7148	19.7621	19.7710	19.8129	19.8129	19.8207	19.7967	19.7710	19.7530	19.7342	(88)
util rest of house													
	0.9865	0.9789	0.9631	0.9233	0.8321	0.6353	0.4285	0.4637	0.7257	0.9214	0.9759	0.9885	(89)
MIT 2	17.8825	18.1254	18.5064	19.0572	19.4629	19.7527	19.8050	19.8095	19.6806	19.1910	18.5201	17.9389	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	18.5094	18.7289	19.0750	19.5710	19.9502	20.2268	20.2898	20.2895	20.1550	19.6905	19.0777	18.5522	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5094	18.7289	19.0750	19.5710	19.9502	20.2268	20.2898	20.2895	20.1550	19.6905	19.0777	18.5522	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9821	0.9735	0.9568	0.9192	0.8404	0.6734	0.4876	0.5214	0.7544	0.9193	0.9709	0.9847	(94)
Useful gains	507.1978	548.8179	568.3826	558.8002	510.2559	392.6518	273.9633	284.7638	405.2829	473.7842	480.6574	487.5716	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1204.8992	1162.0110	1047.1831	850.8859	652.4028	427.6167	280.4117	293.3736	467.3450	718.8473	963.1933	1174.2220	(97)
Space heating kWh													
	519.0898	412.0658	356.2276	210.3017	105.7572	0.0000	0.0000	0.0000	0.0000	182.3269	347.4258	510.8679	(98a)
Space heating requirement - total per year (kWh/year)												2644.0628	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	519.0898	412.0658	356.2276	210.3017	105.7572	0.0000	0.0000	0.0000	0.0000	182.3269	347.4258	510.8679	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2644.0628	
Space heating per m2											(98c) / (4) =	46.4768	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	100.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	519.0898	412.0658	356.2276	210.3017	105.7572	0.0000	0.0000	0.0000	0.0000	182.3269	347.4258	510.8679	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	519.0898	412.0658	356.2276	210.3017	105.7572	0.0000	0.0000	0.0000	0.0000	182.3269	347.4258	510.8679	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.9740	15.2217	13.7054	10.0412	7.7561	6.3368	7.0754	9.1968	11.9458	15.6735	17.7032	19.5014	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2644.0628	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	100.0000	
Water heating fuel used	1738.8922	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	0.0000	(231)
Electricity for lighting (calculated in Appendix L)	153.1313	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	4536.0863	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2644.0628	16.4900	436.0059	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1738.8922	16.4900	286.7433	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	153.1313	16.4900	25.2514	(250)
Additional standing charges			0.0000	(251)
Total energy cost			748.0006	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):	0.3600	(256)
Energy cost factor (ECF) [(255) x (256)] / [(4) + 45.0] =	2.6429	(257)
SAP value	57.1594	
SAP rating (Section 12)	57	(258)
SAP band	D	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2644.0628	0.1549	409.6073	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1738.8922	0.1412	245.4671	(264)
Space and water heating			655.0745	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)

Energy for lighting	153.1313	0.1443	22.1016	(268)
Total CO2, kg/year			677.1760	(272)
CO2 emissions per m2			11.9000	(273)
EI value			91.0942	
EI rating			91	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b) x	2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		122.3135	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9135	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9318	0.9124	0.8930	0.8153	0.7959	0.7183	0.7183	0.7183	0.7183	0.8153	0.8347	0.8735	(22b)
Effective ac	0.9341	0.9162	0.8987	0.8324	0.8167	0.7579	0.7579	0.7579	0.7579	0.8324	0.8484	0.8815	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
New Door			2.1000	1.4000	2.9400			(26)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Corridor Wall	17.5600	2.1000	15.4600	0.1800	2.7828			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			97.6900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.2951			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.5380	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	44.8331	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	37.7040	36.9815	36.2742	33.5972	32.9660	30.5932	30.5932	30.5932	30.5932	33.5972	34.2436	35.5821	(38)
Heat transfer coeff	82.5371	81.8146	81.1073	78.4303	77.7991	75.4263	75.4263	75.4263	75.4263	78.4303	79.0767	80.4152	(39)
Average = Sum(39)m / 12 =												78.4430	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4508	1.4381	1.4257	1.3786	1.3675	1.3258	1.3258	1.3258	1.3258	1.3786	1.3900	1.4135	(40)
HLP (average)												1.3789	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.8925 (42)
Hot water usage for mixer showers	

	62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051 (42a)
Hot water usage for baths												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses												
	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109 (42c)
Average daily hot water use (litres/day)												88.8608 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m													
	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000	(48)
Temperature factor from Table 2b												0.6000	(49)
Enter (49) or (54) in (55)												0.7200	(55)
Total storage loss													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(56)
If cylinder contains dedicated solar storage													
	22.3200	20.1600	22.3200	21.6000	22.3200	21.6000	22.3200	22.3200	21.6000	22.3200	21.6000	22.3200	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
										Total per year (kWh/year) = Sum(64)m =		1738.8922	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.8607	60.9546	64.9037	57.4231	55.9084	50.6455	50.1780	52.0191	52.4230	58.1378	61.4312	68.1557	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	21.6773	19.2536	15.6581	11.8542	8.8611	7.4809	8.0834	10.5071	14.1027	17.9066	20.8996	22.2798	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	246.3300	248.8862	242.4448	228.7319	211.4217	195.1527	184.2839	181.7278	188.1692	201.8821	219.1922	235.4613	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	92.5546	90.7062	87.2361	79.7544	75.1457	70.3410	67.4435	69.9181	72.8098	78.1422	85.3211	91.6071	(72)
Total internal gains													
	446.6590	444.9430	431.4360	406.4374	381.5256	359.0716	345.9079	348.2500	361.1786	384.0278	411.5100	435.4452	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	33.9635	0.7600	0.8000	0.7700	47.5103	(77)
Southwest	1.1800	33.9635	0.7600	0.8000	0.7700	16.8862	(79)

Solar gains	64.3965	112.2302	160.8974	204.1444	224.4748	227.3785	212.5493	191.6259	176.0518	129.3447	78.4956	56.8595	(83)
Total gains	511.0555	557.1732	592.3334	610.5818	606.0003	586.4502	558.4572	539.8759	537.2304	513.3726	490.0056	492.3047	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	47.8657	48.2884	48.7095	50.3720	50.7807	52.3782	52.3782	52.3782	52.3782	50.3720	49.9603	49.1287	
alpha	4.1910	4.2192	4.2473	4.3581	4.3854	4.4919	4.4919	4.4919	4.4919	4.3581	4.3307	4.2752	
util living area													
	0.9892	0.9835	0.9710	0.9393	0.8680	0.7231	0.5914	0.6188	0.8047	0.9446	0.9811	0.9907	(86)
MIT	19.4997	19.6667	19.9509	20.3492	20.6843	20.9066	20.9695	20.9627	20.8391	20.4159	19.9407	19.5057	(87)
Th 2	19.7246	19.7342	19.7437	19.7798	19.7883	19.8207	19.8207	19.8207	19.8207	19.7798	19.7710	19.7530	(88)
util rest of house													
	0.9855	0.9779	0.9607	0.9163	0.8143	0.6203	0.4541	0.4813	0.7188	0.9189	0.9736	0.9875	(89)
MIT 2	18.0365	18.2541	18.6181	19.1341	19.5267	19.7680	19.8104	19.8073	19.7145	19.2218	18.6283	18.0633	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	18.6432	18.8399	19.1708	19.6379	20.0067	20.2401	20.2910	20.2864	20.1808	19.7169	19.1725	18.6614	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6432	18.8399	19.1708	19.6379	20.0067	20.2401	20.2910	20.2864	20.1808	19.7169	19.1725	18.6614	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9812	0.9725	0.9546	0.9130	0.8253	0.6596	0.5113	0.5384	0.7480	0.9173	0.9687	0.9837	(94)
Useful gains	501.4521	541.8773	565.4192	557.4658	500.1582	386.8375	285.5115	290.6671	401.8441	470.9014	474.6728	484.2603	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)

Heat loss rate W

	1150.8345	1115.9414	1011.4696	826.4939	622.9137	417.8726	293.4844	300.6807	458.6513	707.1993	923.0217	1130.7509 (97)
Space heating kWh												
	483.1405	385.7711	331.8615	193.7002	91.3301	0.0000	0.0000	0.0000	0.0000	175.8056	322.8112	480.9890 (98a)
Space heating requirement - total per year (kWh/year)												2465.4093
Solar heating kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh												
	483.1405	385.7711	331.8615	193.7002	91.3301	0.0000	0.0000	0.0000	0.0000	175.8056	322.8112	480.9890 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2465.4093
Space heating per m2											(98c) / (4) =	43.3364 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
Fraction of space heat from main system(s)	1.0000 (202)
Efficiency of main space heating system 1 (in %)	100.0000 (206)
Efficiency of main space heating system 2 (in %)	0.0000 (207)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	483.1405	385.7711	331.8615	193.7002	91.3301	0.0000	0.0000	0.0000	0.0000	175.8056	322.8112	480.9890	(98)
Space heating efficiency (main heating system 1)													
	100.0000	100.0000	100.0000	100.0000	100.0000	0.0000	0.0000	0.0000	0.0000	100.0000	100.0000	100.0000	(210)
Space heating fuel (main heating system)													
	483.1405	385.7711	331.8615	193.7002	91.3301	0.0000	0.0000	0.0000	0.0000	175.8056	322.8112	480.9890	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(64)
Efficiency of water heater												100.0000	(216)
(217)m	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(217)
Fuel for water heating, kWh/month													
	175.7174	154.9767	163.8167	142.3312	136.7633	121.9475	119.5290	125.0660	127.2934	143.4682	154.3856	173.5973	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	18.9740	15.2217	13.7054	10.0412	7.7561	6.3368	7.0754	9.1968	11.9458	15.6735	17.7032	19.5014	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year	
Space heating fuel - main system 1	2465.4093 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	100.0000
Water heating fuel used	1738.8922 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
Total electricity for the above, kWh/year	0.0000 (231)
Electricity for lighting (calculated in Appendix L)	153.1313 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	4357.4329 (238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2465.4093	26.0600	642.4857	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1738.8922	26.0600	453.1553	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(249)
Energy for lighting	153.1313	26.0600	39.9060	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1135.5470	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2465.4093	0.1550	382.0601	(261)

Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1738.8922	0.1412	245.4671	(264)
Space and water heating			627.5272	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	153.1313	0.1443	22.1016	(268)
Total CO2, kg/year			649.6288	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2465.4093	1.5737	3879.9105	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1738.8922	1.5220	2646.5631	(278)
Space and water heating			6526.4735	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	153.1313	1.5338	234.8779	(282)
Total Primary energy kWh/year			6761.3514	(286)

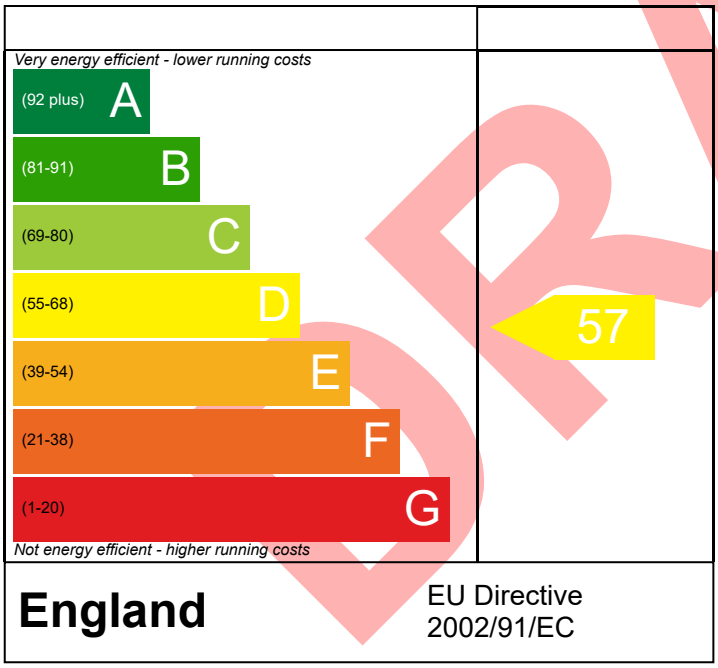
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	56.89 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

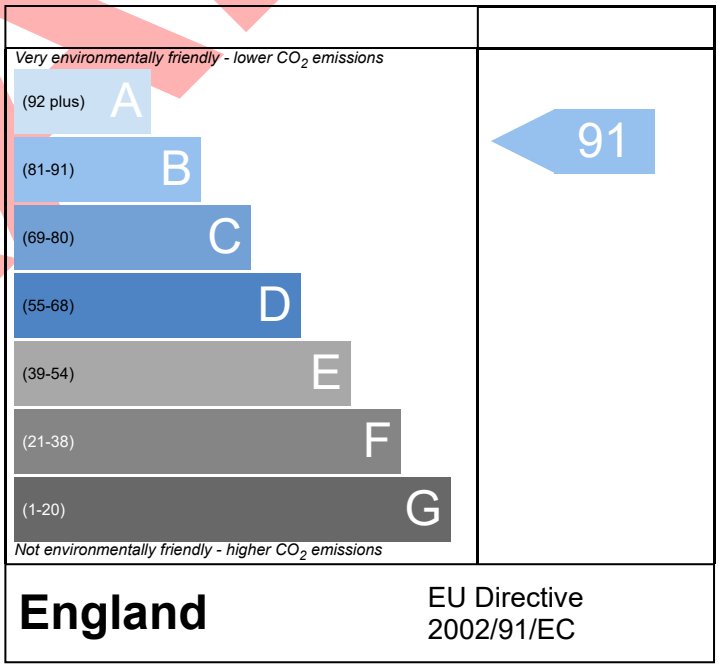
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

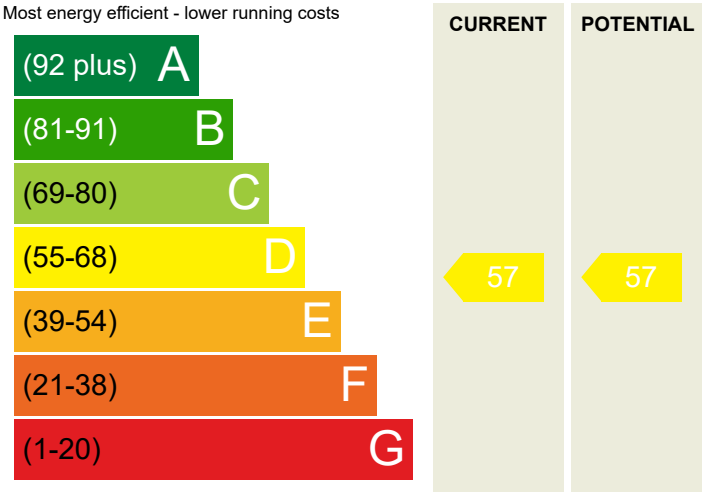
Energy Report

Dwelling Address	
Reference	Apt. 11-Apt. 11
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	57

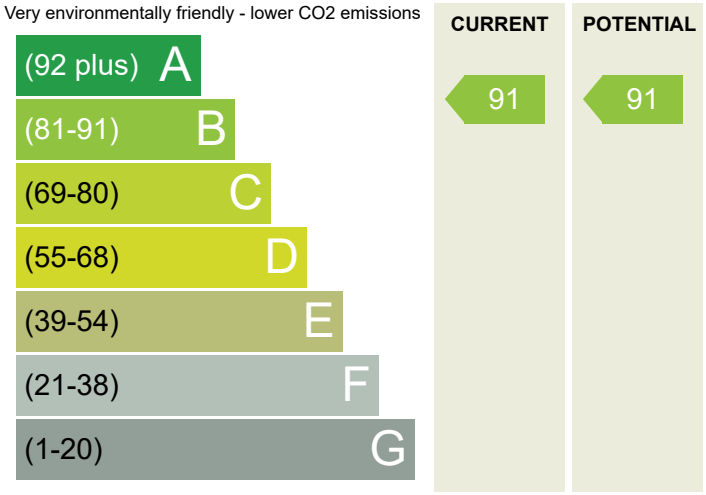
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

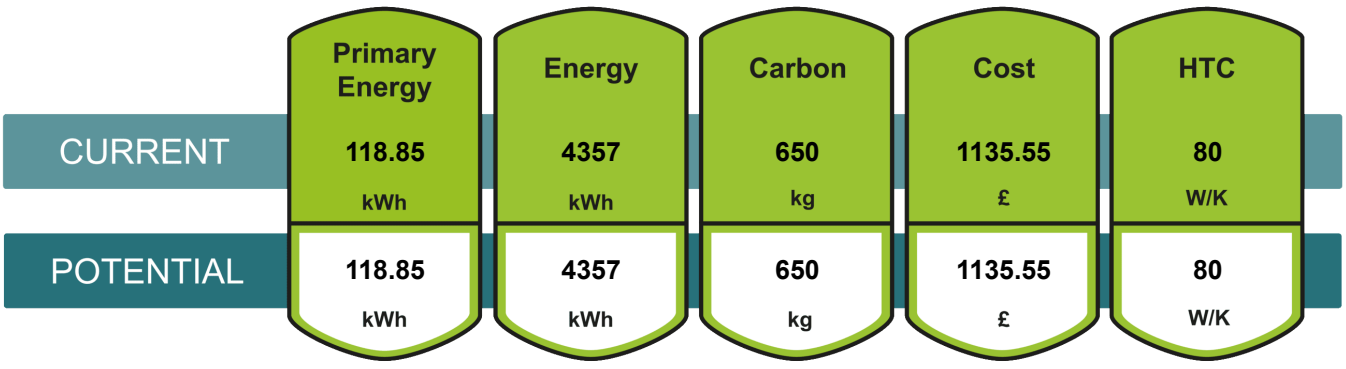
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.22 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Room heaters, electric	Very Poor
Main heating controls	Programmer and appliance thermostats	Good
Secondary heating	None	
Hot water	Electric immersion, standard tariff	Very Poor
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£40	£40	You could save £0
Heating	£642	£642	
Hot Water	£453	£453	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£1136	£1136	

Estimated energy use and potential savings

Space Heating
2465
kWh per year

Water Heating
1739
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 11	Issued on Date	01/10/2024
Assessment Reference	Apt. 11	Prop Type Ref	Detached Flat
Property			

SAP Rating	57 D	DER	12.20	TER	
Environmental	91 B	% DER < TER			N/A
CO_2 Emissions (t/year)	0.65	DFEE	53.94	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	126.85	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northeast (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	10.90	m²	

Description	Corridor Wall		
Type	Solid Wall		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	17.56	m²	

Description	Dormer Wall 1		
Type	Timber Frame		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	10.56	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	26.65	m²	

Description	Dormer Roof 1		
Type	External Flat Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	9.84	m²	

Description	Slope Roof 1		
Type	External Slope Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	22.18	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NW1	New Glazing	Dormer Wall 1	South East	3.32
D NE	New Door	Corridor Wall	North East	2.10

W SW1	New Glazing	External Wall 1	South West	1.18

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System No

Comments

Lighting

No Fixed Lighting	No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	100.00	10.00	1000.00	10

Comments

Main Heating 1

Fuel Type	Electricity	
Winter Efficiency		%
Summer Efficiency		%
Model Name		
Manufacturer		
System Type		
Flue Type		
Fan Assisted Flue	No	
Heat Emitter		
Flow Temperature		
Flow Temperature Value		

Comments

Heating Controls

Description	
Boiler Interlock	No
Delayed Start Stat	No
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Independent
Supplementary Immersion	No
SAP Code	903
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder

	Hot Water Cylinder	
Independent Time Control	No	
Cylinder Stat	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Measured Loss	1.20	kWh/day
Pipes insulation		

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 1	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 1	**Prop Type Ref**	
Property			

SAP Rating	77 C	**DER**	26.15	**TER**	
Environmental	78 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.96	**DFEE**	78.33	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	143.40	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southeast	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	38.05 m	79.24 m²	3.10 m

8.0 Living Area	26.12	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	56.02	47.98	0.00	None	8.04	Enter Gross Area

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	79.24

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Other	0.25	None	0.00	0.00	79.24

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NE1	New Glazing	External Wall 1	North East	5.36	0
W NE2 Upgrade	New Glazing	External Wall 1	North East	2.68	0

Summary for Input Data

elmhurst energy

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	
27.0 Secondary Heating	None	

Summary for Input Data

elmhurst energy

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	
34.0 Small-scale Hydro	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 1	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 1	**Prop Type Ref**	
Property			

SAP Rating	77 C	**DER**	26.15	**TER**	
Environmental	78 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.96	**DFEE**	78.33	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	143.40	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		245.6440	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8314	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9010	0.8834	0.8657	0.7774	0.7597	0.6714	0.6714	0.6537	0.7067	0.7597	0.7950	0.8304	(22b)
Effective ac	0.9059	0.8902	0.8747	0.8022	0.7886	0.7254	0.7254	0.7137	0.7497	0.7886	0.8160	0.8448	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			8.0400	1.3258	10.6591			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Total net area of external elements Aum(A, m2)			135.2600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.8631			(33)
Party Ceiling 1			79.2400					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							27.0520	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		71.9151	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	73.4382	72.1604	70.9079	65.0249	63.9242	58.8003	58.8003	57.8514	60.7739	63.9242	66.1509	68.4788	(38)
Heat transfer coeff	145.3533	144.0755	142.8230	136.9400	135.8393	130.7153	130.7153	129.7665	132.6890	135.8393	138.0660	140.3939	(39)
Average = Sum(39)m / 12 =												136.9347	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.8343	1.8182	1.8024	1.7282	1.7143	1.6496	1.6496	1.6376	1.6745	1.7143	1.7424	1.7718	(40)
HLP (average)												1.7281	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4483	(42)
Hot water usage for mixer showers													
	73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)
Average daily hot water use (litres/day)												103.7251	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)
Energy content (annual)											Total = Sum(45)m =	1723.0069	
Distribution loss (46)m = 0.15 x (45)m													
	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	49.3151	50.5681	46.9775	47.8107	49.3588	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
											Total per year (kWh/year) = Sum(64)m =	2315.5302	(64)
12Total per year (kWh/year)												2316	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	72.2762	63.8318	67.6573	59.1869	57.0596	50.6911	49.6813	52.2174	53.3504	59.7597	63.8654	71.4534	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	122.8866	136.0531	122.8866	126.9829	122.8866	126.9829	122.8866	122.8866	126.9829	122.8866	126.9829	122.8866	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	217.8448	220.1054	214.4089	202.2817	186.9733	172.5855	162.9736	160.7131	166.4096	178.5368	193.8452	208.2329	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)													
	97.1455	94.9878	90.9372	82.2040	76.6930	70.4043	66.7760	70.1847	74.0978	80.3222	88.7020	96.0395	(72)
Total internal gains													
	504.6012	517.8705	494.9570	478.1927	453.2772	429.6970	412.3605	413.5087	427.2145	448.4698	476.2543	493.8833	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	8.0400	11.2829	0.7600	0.8000	0.7700	38.2222	(75)

Solar gains	38.2222	77.8023	140.1750	230.2076	309.4442	329.9003	308.6150	246.0314	170.8054	95.0806	48.0934	31.2141	(83)
Total gains	542.8233	595.6728	635.1320	708.4004	762.7214	759.5973	720.9755	659.5401	598.0199	543.5504	524.3477	525.0974	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.8579	38.1937	38.5287	40.1839	40.5095	42.0974	42.0974	42.4052	41.4712	40.5095	39.8562	39.1953	
alpha	3.5239	3.5462	3.5686	3.6789	3.7006	3.8065	3.8065	3.8270	3.7647	3.7006	3.6571	3.6130	
util living area													
	0.9960	0.9940	0.9897	0.9744	0.9325	0.8283	0.6947	0.7516	0.9197	0.9819	0.9937	0.9966	(86)
MIT	18.7305	18.9166	19.2560	19.8168	20.3227	20.7429	20.9079	20.8742	20.5486	19.9216	19.2928	18.7697	(87)
Th 2	19.4461	19.4573	19.4683	19.5207	19.5306	19.5772	19.5772	19.5858	19.5591	19.5306	19.5106	19.4898	(88)
util rest of house													
	0.9946	0.9917	0.9855	0.9623	0.8955	0.7267	0.5147	0.5831	0.8584	0.9710	0.9908	0.9953	(89)
MIT 2	17.4473	17.6403	17.9856	18.5750	19.0636	19.4549	19.5548	19.5500	19.2986	18.6899	18.0527	17.5164	(90)
Living area fraction										fLA = Living area / (4) =		0.3296	(91)
MIT	17.8703	18.0610	18.4044	18.9843	19.4786	19.8794	20.0008	19.9865	19.7106	19.0959	18.4615	17.9295	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.7203	17.9110	18.2544	18.8343	19.3286	19.7294	19.8508	19.8365	19.5606	18.9459	18.3115	17.7795	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9920	0.9882	0.9804	0.9544	0.8887	0.7399	0.5543	0.6184	0.8585	0.9646	0.9873	0.9931	(94)
Useful gains	538.4906	588.6636	622.6822	676.0937	677.8643	562.0469	399.6117	407.8905	513.4156	524.3119	517.6872	521.4817	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1950.6806	1874.5625	1678.7947	1360.4086	1036.2698	670.4975	424.9281	445.9436	724.5645	1133.7057	1547.9273	1906.4847	(97)
Space heating kWh	1050.6694	864.1241	785.7476	492.7067	266.6537	0.0000	0.0000	0.0000	0.0000	453.3890	741.7729	1030.4422	(98a)
Space heating requirement - total per year (kWh/year)												5685.5056	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	1050.6694	864.1241	785.7476	492.7067	266.6537	0.0000	0.0000	0.0000	0.0000	453.3890	741.7729	1030.4422	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5685.5056	
Space heating per m2											(98c) / (4) =	71.7505	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1050.6694	864.1241	785.7476	492.7067	266.6537	0.0000	0.0000	0.0000	0.0000	453.3890	741.7729	1030.4422	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	1250.7969	1028.7191	935.4139	586.5557	317.4448	0.0000	0.0000	0.0000	0.0000	539.7488	883.0629	1226.7169	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
Efficiency of water heater												75.0000	(216)
(217)m	82.2278	82.1224	81.8804	81.2829	80.0747	75.0000	75.0000	75.0000	75.0000	81.1008	81.8782	82.2155	(217)
Fuel for water heating, kWh/month	279.7304	247.6739	263.9514	234.0487	229.9787	218.8141	215.0405	225.7224	230.2513	237.2015	249.5325	276.7621	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	20.4979	16.4442	14.8061	10.8476	8.3790	6.8457	7.6436	9.9355	12.9052	16.9323	19.1250	21.0676	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	6768.4590	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2908.7074	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	165.4297	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	9957.5961	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6768.4590	0.2100	1421.3764	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2908.7074	0.2100	610.8286	(264)
Space and water heating			2032.2050	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	165.4297	0.1443	23.8766	(268)
Total CO2, kg/year			2072.0335	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			26.1500	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	6768.4590	1.1300	7648.3587	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2908.7074	1.1300	3286.8394	(278)
Space and water heating			10935.1981	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	165.4297	1.5338	253.7415	(282)
Total Primary energy kWh/year			11362.9116	(286)
Dwelling Primary energy Rate (DPER)			143.4000	(287)

Full SAP Calculation Printout

Property Reference	Apt. 1	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 1	**Prop Type Ref**	
Property			

SAP Rating	77 C	**DER**	26.15	**TER**	
Environmental	78 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.96	**DFEE**	78.33	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	143.40	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	245.6440	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1221	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8721	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7413	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9452	0.9266	0.9081	0.8154	0.7969	0.7042	0.7042	0.6857	0.7413	0.7969	0.8340	0.8710	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9467	0.9293	0.9123	0.8325	0.8175	0.7480	0.7480	0.7351	0.7748	0.8175	0.8478	0.8794	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			8.0400	1.3258	10.6591			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Total net area of external elements Aum(A, m2)			135.2600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.8631			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	27.0520	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	71.9151	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	76.7396	75.3336	73.9554	67.4822	66.2711	60.6331	60.6331	59.5890	62.8048	66.2711	68.7211	71.2826	(38)
Heat transfer coeff	148.6547	147.2487	145.8705	139.3973	138.1862	132.5482	132.5482	131.5041	134.7198	138.1862	140.6362	143.1977	(39)
Average = Sum(39)m / 12 =												139.3915	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8760	1.8583	1.8409	1.7592	1.7439	1.6727	1.6727	1.6596	1.7001	1.7439	1.7748	1.8071	(40)
HLP (average)												1.7591	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4483	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	28.1912	27.7725	27.1829	26.0958	25.2818	24.3792	23.8917	24.4771	25.1146	26.0804	27.1899	28.0959	(42b)
Hot water usage for other uses													
	39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)
Average daily hot water use (litres/day)												62.2312	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	67.8940	66.0316	63.9983	61.4675	59.2097	56.8634	56.3758	58.4050	60.4862	62.8958	65.4490	67.7987	(44)
Energy conte	107.5276	94.0282	98.3630	84.1459	79.7077	69.9202	68.1817	72.3176	74.5856	85.3490	93.2441	106.1564	(45)
Energy content (annual)										Total = Sum(45)m =		1033.5269	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	91.3984	79.9239	83.6086	71.5240	67.7515	59.4321	57.9544	61.4700	63.3978	72.5467	79.2575	90.2330	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	91.3984	79.9239	83.6086	71.5240	67.7515	59.4321	57.9544	61.4700	63.3978	72.5467	79.2575	90.2330	(64)
										Total per year (kWh/year) = Sum(64)m =		878.4979	(64)
12Total per year (kWh/year)												878	(64)
Electric shower(s)													
	52.2699	46.5729	50.8558	48.5311	49.4417	47.1626	48.7347	49.4417	48.5311	50.8558	49.8995	52.2699	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						594.5668	(64a)
Heat gains from water heating, kWh/month													
	35.9171	31.6242	33.6161	30.0138	29.2983	26.6487	26.6723	27.7279	27.9822	30.8506	32.2893	35.6257	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	122.8866	136.0531	122.8866	126.9829	122.8866	126.9829	122.8866	122.8866	126.9829	122.8866	126.9829	122.8866	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	217.8448	220.1054	214.4089	202.2817	186.9733	172.5855	162.9736	160.7131	166.4096	178.5368	193.8452	208.2329	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)													
	48.2756	47.0598	45.1829	41.6858	39.3795	37.0121	35.8499	37.2687	38.8642	41.4659	44.8462	47.8840	(72)
Total internal gains													
	448.7313	462.9425	442.2027	430.6746	408.9636	396.3047	381.4344	380.5927	391.9809	402.6136	425.3985	438.7278	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	8.0400	11.2829	0.7600	0.8000	0.7700	38.2222	(75)

Solar gains	38.2222	77.8023	140.1750	230.2076	309.4442	329.9003	308.6150	246.0314	170.8054	95.0806	48.0934	31.2141	(83)
Total gains	486.9535	540.7448	582.3777	660.8822	718.4078	726.2050	690.0493	626.6241	562.7863	497.6941	473.4918	469.9420	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.0172	37.3706	37.7237	39.4755	39.8215	41.5153	41.5153	41.8449	40.8461	39.8215	39.1277	38.4278	
alpha	3.4678	3.4914	3.5149	3.6317	3.6548	3.7677	3.7677	3.7897	3.7231	3.6548	3.6085	3.5619	
util living area													
	0.9972	0.9956	0.9922	0.9795	0.9436	0.8469	0.7193	0.7770	0.9328	0.9863	0.9954	0.9976	(86)
MIT	18.6140	18.8044	19.1528	19.7343	20.2587	20.7118	20.8927	20.8539	20.5025	19.8449	19.1981	18.6598	(87)
Th 2	19.4173	19.4295	19.4415	19.4987	19.5095	19.5604	19.5604	19.5699	19.5407	19.5095	19.4877	19.4650	(88)
util rest of house													
	0.9961	0.9938	0.9889	0.9695	0.9111	0.7493	0.5373	0.6099	0.8782	0.9779	0.9934	0.9967	(89)
MIT 2	17.3118	17.5099	17.8651	18.4799	18.9911	19.4204	19.5337	19.5270	19.2472	18.6007	17.9430	17.3899	(90)
Living area fraction										fLA = Living area / (4) =		0.3296	(91)
MIT	17.7410	17.9366	18.2896	18.8934	19.4090	19.8461	19.9817	19.9644	19.6610	19.0108	18.3567	17.8085	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.7410	17.9366	18.2896	18.8934	19.4090	19.8461	19.9817	19.9644	19.6610	19.0108	18.3567	17.8085	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9943	0.9914	0.9852	0.9638	0.9082	0.7728	0.5982	0.6645	0.8843	0.9737	0.9910	0.9952	(94)
Useful gains	484.1944	536.0703	573.7479	636.9696	652.4292	561.1920	412.7901	416.3960	497.6569	484.6186	469.2155	467.6893	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1998.0712	1919.6217	1719.7531	1393.0495	1065.2720	695.3620	448.2336	468.7314	749.1739	1162.2602	1583.1013	1948.7063	(97)
Space heating kWh													
	1126.3244	929.7465	852.6278	544.3775	307.1550	0.0000	0.0000	0.0000	0.0000	504.1653	801.9978	1101.8766	(98a)
Space heating requirement - total per year (kWh/year)												6168.2709	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	1126.3244	929.7465	852.6278	544.3775	307.1550	0.0000	0.0000	0.0000	0.0000	504.1653	801.9978	1101.8766	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6168.2709	
Space heating per m2											(98c) / (4) =	77.8429	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	1245.9529	980.8565	999.4312	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.5882	0.6755	0.6210	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	732.8782	662.5451	620.6360	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	792.0559	752.5345	680.9134	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	42.6080	66.9521	44.8464	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction											fC = cooled area / (4) =	1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	10.6520	16.7380	11.2116	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												38.6016	(107)
Energy for space heating												77.8429	(99)
Energy for space cooling												0.4871	(108)
Total												78.3300	(109)
Fabric Energy Efficiency (DFEE)												78.3	(109)

Full SAP Calculation Printout

Property Reference	Apt. 1	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 1	**Prop Type Ref**	
Property			

SAP Rating	77 C	**DER**	26.15	**TER**	
Environmental	78 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.96	**DFEE**	78.33	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	143.40	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		245.6440	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8314	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9010	0.8834	0.8657	0.7774	0.7597	0.6714	0.6714	0.6537	0.7067	0.7597	0.7950	0.8304	(22b)
Effective ac	0.9059	0.8902	0.8747	0.8022	0.7886	0.7254	0.7254	0.7137	0.7497	0.7886	0.8160	0.8448	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			8.0400	1.3258	10.6591			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Total net area of external elements Aum(A, m2)			135.2600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.8631			(33)
Party Ceiling 1			79.2400					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							27.0520	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		71.9151	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	73.4382	72.1604	70.9079	65.0249	63.9242	58.8003	58.8003	57.8514	60.7739	63.9242	66.1509	68.4788	(38)
Heat transfer coeff	145.3533	144.0755	142.8230	136.9400	135.8393	130.7153	130.7153	129.7665	132.6890	135.8393	138.0660	140.3939	(39)
Average = Sum(39)m / 12 =												136.9347	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.8343	1.8182	1.8024	1.7282	1.7143	1.6496	1.6496	1.6376	1.6745	1.7143	1.7424	1.7718	(40)
HLP (average)												1.7281	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4483	(42)
Hot water usage for mixer showers													
	73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)
Average daily hot water use (litres/day)												103.7251	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)
Energy content (annual)											Total = Sum(45)m =	1723.0069	
Distribution loss (46)m = 0.15 x (45)m													
	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	49.3151	50.5681	46.9775	47.8107	49.3588	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
											Total per year (kWh/year) = Sum(64)m =	2315.5302	(64)
12Total per year (kWh/year)												2316	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	72.2762	63.8318	67.6573	59.1869	57.0596	50.6911	49.6813	52.2174	53.3504	59.7597	63.8654	71.4534	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	122.4141	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	122.8866	136.0531	122.8866	126.9829	122.8866	126.9829	122.8866	122.8866	126.9829	122.8866	126.9829	122.8866	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	217.8448	220.1054	214.4089	202.2817	186.9733	172.5855	162.9736	160.7131	166.4096	178.5368	193.8452	208.2329	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	35.2414	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)													
	97.1455	94.9878	90.9372	82.2040	76.6930	70.4043	66.7760	70.1847	74.0978	80.3222	88.7020	96.0395	(72)
Total internal gains													
	504.6012	517.8705	494.9570	478.1927	453.2772	429.6970	412.3605	413.5087	427.2145	448.4698	476.2543	493.8833	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	8.0400	11.2829	0.7600	0.8000	0.7700	38.2222	(75)

Solar gains	38.2222	77.8023	140.1750	230.2076	309.4442	329.9003	308.6150	246.0314	170.8054	95.0806	48.0934	31.2141	(83)
Total gains	542.8233	595.6728	635.1320	708.4004	762.7214	759.5973	720.9755	659.5401	598.0199	543.5504	524.3477	525.0974	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.8579	38.1937	38.5287	40.1839	40.5095	42.0974	42.0974	42.4052	41.4712	40.5095	39.8562	39.1953	
alpha	3.5239	3.5462	3.5686	3.6789	3.7006	3.8065	3.8065	3.8270	3.7647	3.7006	3.6571	3.6130	
util living area													
	0.9960	0.9940	0.9897	0.9744	0.9325	0.8283	0.6947	0.7516	0.9197	0.9819	0.9937	0.9966	(86)
MIT	18.7305	18.9166	19.2560	19.8168	20.3227	20.7429	20.9079	20.8742	20.5486	19.9216	19.2928	18.7697	(87)
Th 2	19.4461	19.4573	19.4683	19.5207	19.5306	19.5772	19.5772	19.5858	19.5591	19.5306	19.5106	19.4898	(88)
util rest of house													
	0.9946	0.9917	0.9855	0.9623	0.8955	0.7267	0.5147	0.5831	0.8584	0.9710	0.9908	0.9953	(89)
MIT 2	17.4473	17.6403	17.9856	18.5750	19.0636	19.4549	19.5548	19.5500	19.2986	18.6899	18.0527	17.5164	(90)
Living area fraction										fLA = Living area / (4) =		0.3296	(91)
MIT	17.8703	18.0610	18.4044	18.9843	19.4786	19.8794	20.0008	19.9865	19.7106	19.0959	18.4615	17.9295	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.7203	17.9110	18.2544	18.8343	19.3286	19.7294	19.8508	19.8365	19.5606	18.9459	18.3115	17.7795	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9920	0.9882	0.9804	0.9544	0.8887	0.7399	0.5543	0.6184	0.8585	0.9646	0.9873	0.9931	(94)
Useful gains	538.4906	588.6636	622.6822	676.0937	677.8643	562.0469	399.6117	407.8905	513.4156	524.3119	517.6872	521.4817	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1950.6806	1874.5625	1678.7947	1360.4086	1036.2698	670.4975	424.9281	445.9436	724.5645	1133.7057	1547.9273	1906.4847	(97)
Space heating kWh	1050.6694	864.1241	785.7476	492.7067	266.6537	0.0000	0.0000	0.0000	0.0000	453.3890	741.7729	1030.4422	(98a)
Space heating requirement - total per year (kWh/year)												5685.5056	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	1050.6694	864.1241	785.7476	492.7067	266.6537	0.0000	0.0000	0.0000	0.0000	453.3890	741.7729	1030.4422	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5685.5056	
Space heating per m2											(98c) / (4) =	71.7505	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1050.6694	864.1241	785.7476	492.7067	266.6537	0.0000	0.0000	0.0000	0.0000	453.3890	741.7729	1030.4422	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	1250.7969	1028.7191	935.4139	586.5557	317.4448	0.0000	0.0000	0.0000	0.0000	539.7488	883.0629	1226.7169	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
Efficiency of water heater												75.0000	(216)
(217)m	82.2278	82.1224	81.8804	81.2829	80.0747	75.0000	75.0000	75.0000	75.0000	81.1008	81.8782	82.2155	(217)
Fuel for water heating, kWh/month	279.7304	247.6739	263.9514	234.0487	229.9787	218.8141	215.0405	225.7224	230.2513	237.2015	249.5325	276.7621	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	20.4979	16.4442	14.8061	10.8476	8.3790	6.8457	7.6436	9.9355	12.9052	16.9323	19.1250	21.0676	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	6768.4590	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2908.7074	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	165.4297	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	9957.5961	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6768.4590	0.2100	1421.3764	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2908.7074	0.2100	610.8286	(264)
Space and water heating			2032.2050	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	165.4297	0.1443	23.8766	(268)
Total CO2, kg/year			2072.0335	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			26.1500	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	6768.4590	1.1300	7648.3587	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2908.7074	1.1300	3286.8394	(278)
Space and water heating			10935.1981	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	165.4297	1.5338	253.7415	(282)
Total Primary energy kWh/year			11362.9116	(286)
Dwelling Primary energy Rate (DPER)			143.4000	(287)

Full SAP Calculation Printout

Property Reference	Apt. 1	Issued on Date	01/10/2024
Assessment Reference	Apt. 1	Prop Type Ref	
Property			

SAP Rating	77 C	DER	26.15	TER	
Environmental	78 C	% DER < TER			N/A
CO_2 Emissions (t/year)	1.96	DFEE	78.33	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	143.40	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		245.6440	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8314 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9010	0.8834	0.8657	0.7774	0.7597	0.6714	0.6714	0.6537	0.7067	0.7597	0.7950	0.8304	(22b)
Effective ac	0.9059	0.8902	0.8747	0.8022	0.7886	0.7254	0.7254	0.7137	0.7497	0.7886	0.8160	0.8448	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			8.0400	1.3258	10.6591			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Total net area of external elements Aum(A, m2)			135.2600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.8631			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	27.0520	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	71.9151	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	73.4382	72.1604	70.9079	65.0249	63.9242	58.8003	58.8003	57.8514	60.7739	63.9242	66.1509	68.4788	(38)
Heat transfer coeff	145.3533	144.0755	142.8230	136.9400	135.8393	130.7153	130.7153	129.7665	132.6890	135.8393	138.0660	140.3939	(39)
Average = Sum(39)m / 12 =												136.9347	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.8343	1.8182	1.8024	1.7282	1.7143	1.6496	1.6496	1.6376	1.6745	1.7143	1.7424	1.7718	(40)
HLP (average)												1.7281	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4483	(42)
Hot water usage for mixer showers													
	73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)
Average daily hot water use (litres/day)												103.7251	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)
Energy content (annual)											Total = Sum(45)m =	1723.0069	
Distribution loss (46)m = 0.15 x (45)m													
	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	49.3151	50.5681	46.9775	47.8107	49.3588	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
											Total per year (kWh/year) = Sum(64)m =	2315.5302	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month													
	72.2762	63.8318	67.6573	59.1869	57.0596	50.6911	49.6813	52.2174	53.3504	59.7597	63.8654	71.4534	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.4183	20.7999	16.9156	12.8062	9.5728	8.0818	8.7326	11.3510	15.2353	19.3447	22.5781	24.0691	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	325.1415	328.5155	320.0132	301.9129	279.0646	257.5903	243.2442	239.8703	248.3725	266.4728	289.3212	310.7954	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)													
	97.1455	94.9878	90.9372	82.2040	76.6930	70.4043	66.7760	70.1847	74.0978	80.3222	88.7020	96.0395	(72)
Total internal gains													
	553.8089	552.4068	535.9697	505.0267	473.4340	437.1801	419.8565	422.5096	438.8092	474.2433	508.7049	539.0077	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	8.0400	11.2829	0.7600	0.8000	0.7700	38.2222	(75)

Solar gains	38.2222	77.8023	140.1750	230.2076	309.4442	329.9003	308.6150	246.0314	170.8054	95.0806	48.0934	31.2141	(83)
Total gains	592.0311	630.2091	676.1447	735.2344	782.8783	767.0804	728.4715	668.5411	609.6147	569.3239	556.7983	570.2218	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.8579	38.1937	38.5287	40.1839	40.5095	42.0974	42.0974	42.4052	41.4712	40.5095	39.8562	39.1953	
alpha	3.5239	3.5462	3.5686	3.6789	3.7006	3.8065	3.8065	3.8270	3.7647	3.7006	3.6571	3.6130	
util living area													
	0.9948	0.9928	0.9875	0.9714	0.9276	0.8248	0.6900	0.7457	0.9156	0.9790	0.9923	0.9955	(86)
MIT	18.7885	18.9571	19.3033	19.8461	20.3412	20.7472	20.9101	20.8778	20.5587	19.9507	19.3313	18.8236	(87)
Th 2	19.4461	19.4573	19.4683	19.5207	19.5306	19.5772	19.5772	19.5858	19.5591	19.5306	19.5106	19.4898	(88)
util rest of house													
	0.9928	0.9901	0.9824	0.9581	0.8888	0.7223	0.5102	0.5768	0.8523	0.9668	0.9889	0.9939	(89)
MIT 2	17.5049	17.6804	18.0320	18.6028	19.0793	19.4575	19.5554	19.5513	19.3063	18.7176	18.0907	17.5700	(90)
Living area fraction									fLA = Living area / (4) =			0.3296	(91)
MIT	17.9280	18.1012	18.4510	19.0126	19.4952	19.8826	20.0020	19.9885	19.7191	19.1241	18.4996	17.9832	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.7780	17.9512	18.3010	18.8626	19.3452	19.7326	19.8520	19.8385	19.5691	18.9741	18.3496	17.8332	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9897	0.9861	0.9766	0.9498	0.8823	0.7359	0.5497	0.6124	0.8529	0.9599	0.9848	0.9911	(94)
Useful gains	585.9127	621.4667	660.3499	698.3141	690.7406	564.5067	400.4503	409.3988	519.9400	546.4895	548.3406	565.1639	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1959.0779	1880.3576	1685.4588	1364.2803	1038.5230	670.9124	425.0802	446.2083	725.6885	1137.5312	1553.1874	1914.0214	(97)
Space heating kWh	1021.6349	845.9747	762.6810	479.4956	258.7501	0.0000	0.0000	0.0000	0.0000	439.7351	723.4897	1003.5499	(98a)
Space heating requirement - total per year (kWh/year)												5535.3111	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	1021.6349	845.9747	762.6810	479.4956	258.7501	0.0000	0.0000	0.0000	0.0000	439.7351	723.4897	1003.5499	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5535.3111	
Space heating per m2											(98c) / (4) =	69.8550	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1021.6349	845.9747	762.6810	479.4956	258.7501	0.0000	0.0000	0.0000	0.0000	439.7351	723.4897	1003.5499	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	1216.2320	1007.1127	907.9536	570.8281	308.0359	0.0000	0.0000	0.0000	0.0000	523.4941	861.2972	1194.7023	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
Efficiency of water heater												75.0000	(216)
(217)m	82.1876	82.0906	81.8317	81.2311	80.0080	75.0000	75.0000	75.0000	75.0000	81.0404	81.8374	82.1773	(217)
Fuel for water heating, kWh/month	279.8673	247.7697	264.1084	234.1980	230.1705	218.8141	215.0405	225.7224	230.2513	237.3783	249.6567	276.8905	(219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	20.4979	16.4442	14.8061	10.8476	8.3790	6.8457	7.6436	9.9355	12.9052	16.9323	19.1250	21.0676	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	6589.6560	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2909.8676	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	165.4297	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	9779.9533	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6589.6560	3.6400	239.8635	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2909.8676	3.6400	105.9192	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	165.4297	16.4900	27.2793	(250)
Additional standing charges			92.0000	(251)
Total energy cost			484.0255	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.4025	(257)
SAP value		77.2651	
SAP rating (Section 12)		77	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6589.6560	0.2100	1383.8278	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2909.8676	0.2100	611.0722	(264)
Space and water heating			1994.9000	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	165.4297	0.1443	23.8766	(268)
Total CO2, kg/year			2034.7285	(272)
CO2 emissions per m2			25.6800	(273)
EI value			78.0543	
EI rating			78	(274)
EI band			C	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		245.6440	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8314	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8480	0.8304	0.8127	0.7420	0.7244	0.6537	0.6537	0.6537	0.6537	0.7420	0.7597	0.7950	(22b)
Effective ac	0.8596	0.8448	0.8303	0.7753	0.7624	0.7137	0.7137	0.7137	0.7137	0.7753	0.7886	0.8160	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			8.0400	1.3258	10.6591			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Total net area of external elements Aum(A, m2)			135.2600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.8631			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	27.0520	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	71.9151	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

(38)m	69.6807	68.4788	67.3022	62.8488	61.7987	57.8514	57.8514	57.8514	57.8514	62.8488	63.9242	66.1509	(38)
Heat transfer coeff													
	141.5958	140.3939	139.2173	134.7639	133.7138	129.7665	129.7665	129.7665	129.7665	134.7639	135.8393	138.0660	(39)
Average = Sum(39)m / 12 =												134.7850	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7869	1.7718	1.7569	1.7007	1.6875	1.6376	1.6376	1.6376	1.6376	1.7007	1.7143	1.7424	(40)
HLP (average)												1.7010	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4483	(42)
Hot water usage for mixer showers													
	73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)
Average daily hot water use (litres/day)												103.7251	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)
Energy content (annual)										Total = Sum(45)m =		1723.0069	
Distribution loss (46)m = 0.15 x (45)m													
	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	49.3151	50.5681	46.9775	47.8107	49.3588	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
										Total per year (kWh/year) = Sum(64)m =		2315.5302	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	72.2762	63.8318	67.6573	59.1869	57.0596	50.6911	49.6813	52.2174	53.3504	59.7597	63.8654	71.4534	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.4183	20.7999	16.9156	12.8062	9.5728	8.0818	8.7326	11.3510	15.2353	19.3447	22.5781	24.0691	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	325.1415	328.5155	320.0132	301.9129	279.0646	257.5903	243.2442	239.8703	248.3725	266.4728	289.3212	310.7954	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)													
	97.1455	94.9878	90.9372	82.2040	76.6930	70.4043	66.7760	70.1847	74.0978	80.3222	88.7020	96.0395	(72)
Total internal gains													
	553.8089	552.4068	535.9697	505.0267	473.4340	437.1801	419.8565	422.5096	438.8092	474.2433	508.7049	539.0077	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	8.0400	10.4150	0.7600	0.8000	0.7700	35.2820	(75)

Solar gains	35.2820	73.4800	138.7149	233.2771	307.8325	334.8488	303.7163	238.1960	170.8054	93.6400	45.1786	29.7277	(83)
Total gains	589.0909	625.8868	674.6845	738.3038	781.2666	772.0289	723.5728	660.7057	609.6147	567.8833	553.8835	568.7354	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.8626	39.1953	39.5265	40.8327	41.1534	42.4052	42.4052	42.4052	42.4052	40.8327	40.5095	39.8562	
alpha	3.5908	3.6130	3.6351	3.7222	3.7436	3.8270	3.8270	3.8270	3.8270	3.7222	3.7006	3.6571	
util living area													
	0.9945	0.9926	0.9870	0.9691	0.9201	0.8149	0.7107	0.7600	0.9131	0.9785	0.9917	0.9952	(86)
MIT	18.9124	19.0593	19.3860	19.9080	20.4029	20.7659	20.8972	20.8661	20.5791	19.9766	19.4242	18.9263	(87)
Th 2	19.4792	19.4898	19.5003	19.5403	19.5498	19.5858	19.5858	19.5858	19.5858	19.5403	19.5306	19.5106	(88)
util rest of house													
	0.9924	0.9897	0.9816	0.9547	0.8769	0.7086	0.5405	0.5967	0.8494	0.9658	0.9879	0.9934	(89)
MIT 2	17.6511	17.8047	18.1363	18.6771	19.1501	19.4778	19.5581	19.5459	19.3447	18.7499	18.1971	17.6868	(90)
Living area fraction										fLA = Living area / (4) =		0.3296	(91)
MIT	18.0669	18.2182	18.5482	19.0829	19.5630	19.9024	19.9996	19.9811	19.7516	19.1542	18.6016	18.0954	(92)

Temperature adjustment												-0.1500	
adjusted MIT	17.9169	18.0682	18.3982	18.9329	19.4130	19.7524	19.8496	19.8311	19.6016	19.0042	18.4516	17.9454	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9892	0.9857	0.9758	0.9464	0.8716	0.7237	0.5770	0.6303	0.8504	0.9589	0.9836	0.9906	(94)
Useful gains	582.6997	616.9387	658.3553	698.7384	680.9441	558.7045	417.4979	416.4678	518.3935	544.5421	544.8163	563.3718	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1871.4534	1806.6219	1628.5973	1325.1135	991.2260	655.6350	447.6363	458.2126	713.9271	1119.1099	1487.6527	1842.5391	(97)
Space heating kWh	958.8328	799.4671	721.8600	450.9901	230.8497	0.0000	0.0000	0.0000	0.0000	427.4784	678.8422	951.7005	(98a)
Space heating requirement - total per year (kWh/year)												5220.0208	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	958.8328	799.4671	721.8600	450.9901	230.8497	0.0000	0.0000	0.0000	0.0000	427.4784	678.8422	951.7005	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5220.0208	
Space heating per m2											(98c) / (4) =	65.8761	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	958.8328	799.4671	721.8600	450.9901	230.8497	0.0000	0.0000	0.0000	0.0000	427.4784	678.8422	951.7005	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	1141.4676	951.7466	859.3572	536.8929	274.8211	0.0000	0.0000	0.0000	0.0000	508.9028	808.1455	1132.9768	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
Efficiency of water heater												75.0000	(216)
(217)m	82.0940	82.0042	81.7399	81.1123	79.7532	75.0000	75.0000	75.0000	75.0000	80.9840	81.7310	82.0990	(217)
Fuel for water heating, kWh/month													
	280.1863	248.0308	264.4051	234.5412	230.9059	218.8141	215.0405	225.7224	230.2513	237.5437	249.9816	277.1547	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	20.4979	16.4442	14.8061	10.8476	8.3790	6.8457	7.6436	9.9355	12.9052	16.9323	19.1250	21.0676	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	6214.3105	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2912.5776	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	165.4297	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	9407.3177	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6214.3105	5.6000	348.0014	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2912.5776	5.6000	163.1043	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)

Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	165.4297	26.0600	43.1110	(250)
Additional standing charges			99.0000	(251)
Total energy cost			683.1857	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6214.3105	0.2100	1305.0052	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2912.5776	0.2100	611.6413	(264)
Space and water heating			1916.6465	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	165.4297	0.1443	23.8766	(268)
Total CO2, kg/year			1956.4750	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	6214.3105	1.1300	7022.1709	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2912.5776	1.1300	3291.2126	(278)
Space and water heating			10313.3835	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	165.4297	1.5338	253.7415	(282)
Total Primary energy kWh/year			10741.0971	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 1

Current energy efficiency rating: C 77
Current environmental impact rating: C 78

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: C 77
Potential environmental impact rating: C 78

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£73	£73	£0
Mains gas	£610	£610	£0
Space heating	£477	£477	£0
Water heating	£163	£163	£0
Lighting	£43	£43	£0
Total cost of fuels	£683	£683	£0
Total cost of uses	£683	£683	£0
Delivered energy	119 kWh/m²	119 kWh/m²	0 kWh/m²
Carbon dioxide emissions	2.0 tonnes	2.0 tonnes	0.0 tonnes
CO2 emissions per m²	25 kg/m²	25 kg/m²	0 kg/m²
Primary energy	136 kWh/m²	136 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	79.2400	(1b)	x 3.1000	(2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	79.2400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		245.6440	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8314	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9010	0.8834	0.8657	0.7774	0.7597	0.6714	0.6714	0.6537	0.7067	0.7597	0.7950	0.8304	(22b)
Effective ac	0.9059	0.8902	0.8747	0.8022	0.7886	0.7254	0.7254	0.7137	0.7497	0.7886	0.8160	0.8448	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			8.0400	1.3258	10.6591			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Total net area of external elements Aum(A, m2)			135.2600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.8631			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	27.0520	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	71.9151	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	73.4382	72.1604	70.9079	65.0249	63.9242	58.8003	58.8003	57.8514	60.7739	63.9242	66.1509	68.4788	(38)
Heat transfer coeff	145.3533	144.0755	142.8230	136.9400	135.8393	130.7153	130.7153	129.7665	132.6890	135.8393	138.0660	140.3939	(39)
Average = Sum(39)m / 12 =												136.9347	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8343	1.8182	1.8024	1.7282	1.7143	1.6496	1.6496	1.6376	1.6745	1.7143	1.7424	1.7718	(40)
HLP (average)												1.7281	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.4483	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)

Average daily hot water use (litres/day)	103.7251 (43)

Daily hot water use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte 179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)

Energy content (annual) Total = Sum(45)m =	1723.0069

Distribution loss (46)m = 0.15 x (45)m

26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)

Water storage loss:

Total storage loss

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)

If cylinder contains dedicated solar storage

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 50.9589	46.0274	50.9589	49.3151	50.5681	46.9775	47.8107	49.3588	49.3151	50.9589	49.3151	50.9589	(61)

Total heat required for water heating calculated for each month

230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)

Total per year (kWh/year) = Sum(64)m =	2315.5302 (64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000 (64a)

Heat gains from water heating, kWh/month

72.2762	63.8318	67.6573	59.1869	57.0596	50.6911	49.6813	52.2174	53.3504	59.7597	63.8654	71.4534	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	23.4183	20.7999	16.9156	12.8062	9.5728	8.0818	8.7326	11.3510	15.2353	19.3447	22.5781	24.0691	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	325.1415	328.5155	320.0132	301.9129	279.0646	257.5903	243.2442	239.8703	248.3725	266.4728	289.3212	310.7954	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)

Water heating gains (Table 5)

	97.1455	94.9878	90.9372	82.2040	76.6930	70.4043	66.7760	70.1847	74.0978	80.3222	88.7020	96.0395	(72)

Total internal gains

	553.8089	552.4068	535.9697	505.0267	473.4340	437.1801	419.8565	422.5096	438.8092	474.2433	508.7049	539.0077	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	8.0400	11.2829	0.7600	0.8000	0.7700	38.2222	(75)

Solar gains	38.2222	77.8023	140.1750	230.2076	309.4442	329.9003	308.6150	246.0314	170.8054	95.0806	48.0934	31.2141	(83)
Total gains	592.0311	630.2091	676.1447	735.2344	782.8783	767.0804	728.4715	668.5411	609.6147	569.3239	556.7983	570.2218	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.8579	38.1937	38.5287	40.1839	40.5095	42.0974	42.0974	42.4052	41.4712	40.5095	39.8562	39.1953	
alpha	3.5239	3.5462	3.5686	3.6789	3.7006	3.8065	3.8065	3.8270	3.7647	3.7006	3.6571	3.6130	
util living area	0.9948	0.9928	0.9875	0.9714	0.9276	0.8248	0.6900	0.7457	0.9156	0.9790	0.9923	0.9955	(86)
MIT	18.7885	18.9571	19.3033	19.8461	20.3412	20.7472	20.9101	20.8778	20.5587	19.9507	19.3313	18.8236	(87)
Th 2	19.4461	19.4573	19.4683	19.5207	19.5306	19.5772	19.5772	19.5858	19.5591	19.5306	19.5106	19.4898	(88)
util rest of house	0.9928	0.9901	0.9824	0.9581	0.8888	0.7223	0.5102	0.5768	0.8523	0.9668	0.9889	0.9939	(89)
MIT 2	17.5049	17.6804	18.0320	18.6028	19.0793	19.4575	19.5554	19.5513	19.3063	18.7176	18.0907	17.5700	(90)
Living area fraction									fLA = Living area / (4) =			0.3296	(91)
MIT	17.9280	18.1012	18.4510	19.0126	19.4952	19.8826	20.0020	19.9885	19.7191	19.1241	18.4996	17.9832	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.7780	17.9512	18.3010	18.8626	19.3452	19.7326	19.8520	19.8385	19.5691	18.9741	18.3496	17.8332	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9897	0.9861	0.9766	0.9498	0.8823	0.7359	0.5497	0.6124	0.8529	0.9599	0.9848	0.9911	(94)
Useful gains	585.9127	621.4667	660.3499	698.3141	690.7406	564.5067	400.4503	409.3988	519.9400	546.4895	548.3406	565.1639	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1959.0779	1880.3576	1685.4588	1364.2803	1038.5230	670.9124	425.0802	446.2083	725.6885	1137.5312	1553.1874	1914.0214	(97)
Space heating kWh	1021.6349	845.9747	762.6810	479.4956	258.7501	0.0000	0.0000	0.0000	0.0000	439.7351	723.4897	1003.5499	(98a)
Space heating requirement - total per year (kWh/year)												5535.3111	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	1021.6349	845.9747	762.6810	479.4956	258.7501	0.0000	0.0000	0.0000	0.0000	439.7351	723.4897	1003.5499	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5535.3111	
Space heating per m2											(98c) / (4) =	69.8550	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1021.6349	845.9747	762.6810	479.4956	258.7501	0.0000	0.0000	0.0000	0.0000	439.7351	723.4897	1003.5499	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	1216.2320	1007.1127	907.9536	570.8281	308.0359	0.0000	0.0000	0.0000	0.0000	523.4941	861.2972	1194.7023	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
Efficiency of water heater												75.0000	(216)

(217)m	82.1876	82.0906	81.8317	81.2311	80.0080	75.0000	75.0000	75.0000	75.0000	81.0404	81.8374	82.1773 (217)
Fuel for water heating, kWh/month												
	279.8673	247.7697	264.1084	234.1980	230.1705	218.8141	215.0405	225.7224	230.2513	237.3783	249.6567	276.8905 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	20.4979	16.4442	14.8061	10.8476	8.3790	6.8457	7.6436	9.9355	12.9052	16.9323	19.1250	21.0676 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year		
Space heating fuel - main system 1	6589.6560	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2909.8676	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	165.4297	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	9779.9533	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6589.6560	3.6400	239.8635	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2909.8676	3.6400	105.9192	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	165.4297	16.4900	27.2793	(250)
Additional standing charges			92.0000	(251)
Total energy cost			484.0255	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.4025	(257)
SAP value		77.2651	
SAP rating (Section 12)		77	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6589.6560	0.2100	1383.8278	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2909.8676	0.2100	611.0722	(264)
Space and water heating			1994.9000	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	165.4297	0.1443	23.8766	(268)
Total CO2, kg/year			2034.7285	(272)
CO2 emissions per m2			25.6800	(273)
EI value			78.0543	
EI rating			78	(274)
EI band			C	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)

Ground floor	79.2400 (1b) x 3.1000 (2b) =	245.6440	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n) 79.2400			(4)
Dwelling volume	(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	245.6440	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0814	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8314	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7067	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8480	0.8304	0.8127	0.7420	0.7244	0.6537	0.6537	0.6537	0.6537	0.7420	0.7597	0.7950	(22b)
Effective ac	0.8596	0.8448	0.8303	0.7753	0.7624	0.7137	0.7137	0.7137	0.7137	0.7753	0.7886	0.8160	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			8.0400	1.3258	10.6591			(27)
Heatloss Floor 1			79.2400	0.2500	19.8100			(28a)
External Wall 1	56.0200	8.0400	47.9800	0.3000	14.3940			(29a)
Total net area of external elements Aum(A, m2)			135.2600					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		44.8631			(33)
Party Ceiling 1			79.2400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	27.0520	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	71.9151	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	69.6807	68.4788	67.3022	62.8488	61.7987	57.8514	57.8514	57.8514	57.8514	62.8488	63.9242	66.1509	(38)
Heat transfer coeff	141.5958	140.3939	139.2173	134.7639	133.7138	129.7665	129.7665	129.7665	129.7665	134.7639	135.8393	138.0660	(39)
Average = Sum(39)m / 12 =												134.7850	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7869	1.7718	1.7569	1.7007	1.6875	1.6376	1.6376	1.6376	1.6376	1.7007	1.7143	1.7424	(40)
HLP (average)												1.7010	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.4483	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
73.3558	72.2534	70.6470	67.5734	65.3052	62.7757	61.3379	62.9322	64.6798	67.3957	70.5352	73.0747	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

39.7029	38.2591	36.8154	35.3716	33.9279	32.4842	32.4842	33.9279	35.3716	36.8154	38.2591	39.7029	(42c)

Average daily hot water use (litres/day)	103.7251	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	113.0586	110.5125	107.4623	102.9450	99.2331	95.2598	93.8221	96.8601	100.0514	104.2110	108.7944	112.7776	(44)
Energy conte	179.0572	157.3683	165.1656	140.9266	133.5868	117.1331	113.4697	119.9330	123.3734	141.4134	154.9975	176.5824	(45)
Energy content (annual)										Total = Sum(45)m =		1723.0069	
Distribution loss (46)m = 0.15 x (45)m	26.8586	23.6052	24.7748	21.1390	20.0380	17.5700	17.0205	17.9899	18.5060	21.2120	23.2496	26.4874	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	49.3151	50.5681	46.9775	47.8107	49.3588	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
										Total per year (kWh/year) = Sum(64)m =		2315.5302	(64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	72.2762	63.8318	67.6573	59.1869	57.0596	50.6911	49.6813	52.2174	53.3504	59.7597	63.8654	71.4534	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	146.8970	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	23.4183	20.7999	16.9156	12.8062	9.5728	8.0818	8.7326	11.3510	15.2353	19.3447	22.5781	24.0691	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	325.1415	328.5155	320.0132	301.9129	279.0646	257.5903	243.2442	239.8703	248.3725	266.4728	289.3212	310.7954	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	52.1380	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	-97.9313	(71)
Water heating gains (Table 5)													
	97.1455	94.9878	90.9372	82.2040	76.6930	70.4043	66.7760	70.1847	74.0978	80.3222	88.7020	96.0395	(72)
Total internal gains													
	553.8089	552.4068	535.9697	505.0267	473.4340	437.1801	419.8565	422.5096	438.8092	474.2433	508.7049	539.0077	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	8.0400	10.4150	0.7600	0.8000	0.7700	35.2820	(75)

Solar gains	35.2820	73.4800	138.7149	233.2771	307.8325	334.8488	303.7163	238.1960	170.8054	93.6400	45.1786	29.7277	(83)
Total gains	589.0909	625.8868	674.6845	738.3038	781.2666	772.0289	723.5728	660.7057	609.6147	567.8833	553.8835	568.7354	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.8626	39.1953	39.5265	40.8327	41.1534	42.4052	42.4052	42.4052	42.4052	40.8327	40.5095	39.8562	
alpha	3.5908	3.6130	3.6351	3.7222	3.7436	3.8270	3.8270	3.8270	3.8270	3.7222	3.7006	3.6571	
util living area													
	0.9945	0.9926	0.9870	0.9691	0.9201	0.8149	0.7107	0.7600	0.9131	0.9785	0.9917	0.9952	(86)
MIT	18.9124	19.0593	19.3860	19.9080	20.4029	20.7659	20.8972	20.8661	20.5791	19.9766	19.4242	18.9263	(87)
Th 2	19.4792	19.4898	19.5003	19.5403	19.5498	19.5858	19.5858	19.5858	19.5858	19.5403	19.5306	19.5106	(88)
util rest of house													
	0.9924	0.9897	0.9816	0.9547	0.8769	0.7086	0.5405	0.5967	0.8494	0.9658	0.9879	0.9934	(89)
MIT 2	17.6511	17.8047	18.1363	18.6771	19.1501	19.4778	19.5581	19.5459	19.3447	18.7499	18.1971	17.6868	(90)
Living area fraction									fLA = Living area / (4) =			0.3296	(91)
MIT	18.0669	18.2182	18.5482	19.0829	19.5630	19.9024	19.9996	19.9811	19.7516	19.1542	18.6016	18.0954	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9169	18.0682	18.3982	18.9329	19.4130	19.7524	19.8496	19.8311	19.6016	19.0042	18.4516	17.9454	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9892	0.9857	0.9758	0.9464	0.8716	0.7237	0.5770	0.6303	0.8504	0.9589	0.9836	0.9906	(94)
Useful gains	582.6997	616.9387	658.3553	698.7384	680.9441	558.7045	417.4979	416.4678	518.3935	544.5421	544.8163	563.3718	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1871.4534	1806.6219	1628.5973	1325.1135	991.2260	655.6350	447.6363	458.2126	713.9271	1119.1099	1487.6527	1842.5391	(97)
Space heating kWh													
	958.8328	799.4671	721.8600	450.9901	230.8497	0.0000	0.0000	0.0000	0.0000	427.4784	678.8422	951.7005	(98a)
Space heating requirement - total per year (kWh/year)												5220.0208	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	958.8328	799.4671	721.8600	450.9901	230.8497	0.0000	0.0000	0.0000	0.0000	427.4784	678.8422	951.7005	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5220.0208	
Space heating per m2											(98c) / (4) =	65.8761	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	958.8328	799.4671	721.8600	450.9901	230.8497	0.0000	0.0000	0.0000	0.0000	427.4784	678.8422	951.7005	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	1141.4676	951.7466	859.3572	536.8929	274.8211	0.0000	0.0000	0.0000	0.0000	508.9028	808.1455	1132.9768	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	230.0161	203.3957	216.1245	190.2417	184.1549	164.1105	161.2804	169.2918	172.6884	192.3723	204.3126	227.5413	(64)
Efficiency of water heater												75.0000	(216)
(217)m	82.0940	82.0042	81.7399	81.1123	79.7532	75.0000	75.0000	75.0000	75.0000	80.9840	81.7310	82.0990	(217)
Fuel for water heating, kWh/month													
	280.1863	248.0308	264.4051	234.5412	230.9059	218.8141	215.0405	225.7224	230.2513	237.5437	249.9816	277.1547	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	20.4979	16.4442	14.8061	10.8476	8.3790	6.8457	7.6436	9.9355	12.9052	16.9323	19.1250	21.0676	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	6214.3105	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2912.5776	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	165.4297	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	9407.3177	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	6214.3105	5.6000	348.0014	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2912.5776	5.6000	163.1043	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	165.4297	26.0600	43.1110	(250)
Additional standing charges			99.0000	(251)
Total energy cost			683.1857	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	6214.3105	0.2100	1305.0052	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2912.5776	0.2100	611.6413	(264)
Space and water heating			1916.6465	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	165.4297	0.1443	23.8766	(268)
Total CO2, kg/year			1956.4750	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	6214.3105	1.1300	7022.1709	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2912.5776	1.1300	3291.2126	(278)
Space and water heating			10313.3835	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	165.4297	1.5338	253.7415	(282)
Total Primary energy kWh/year			10741.0971	(286)

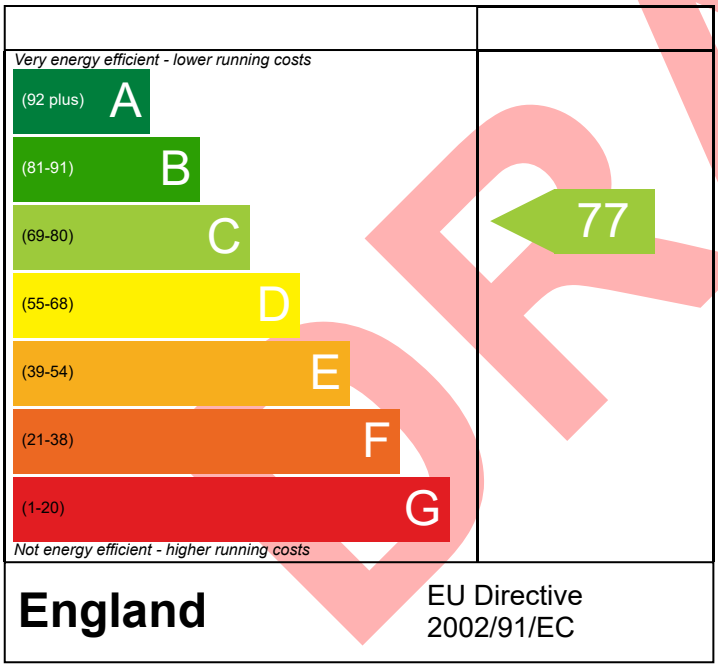
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	79.24 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

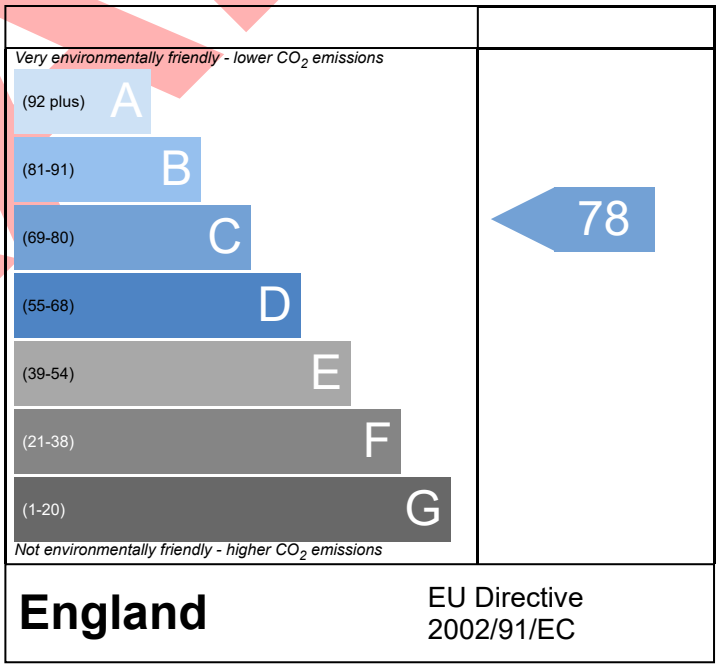
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

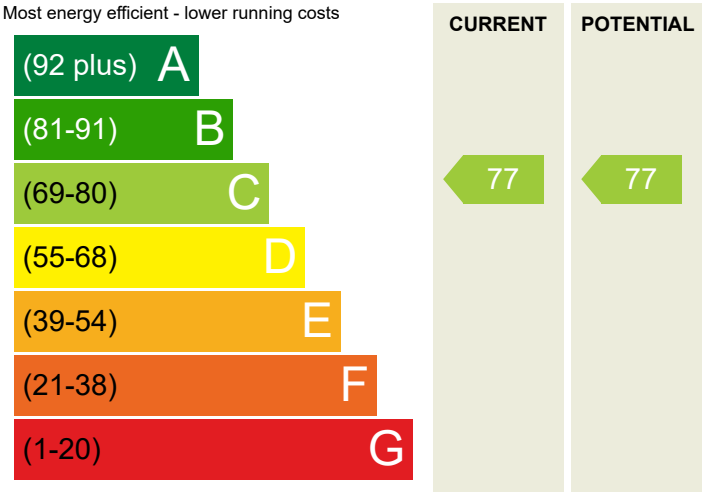
Energy Report

Dwelling Address	
Reference	Apt. 1-Apt. 1
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	79

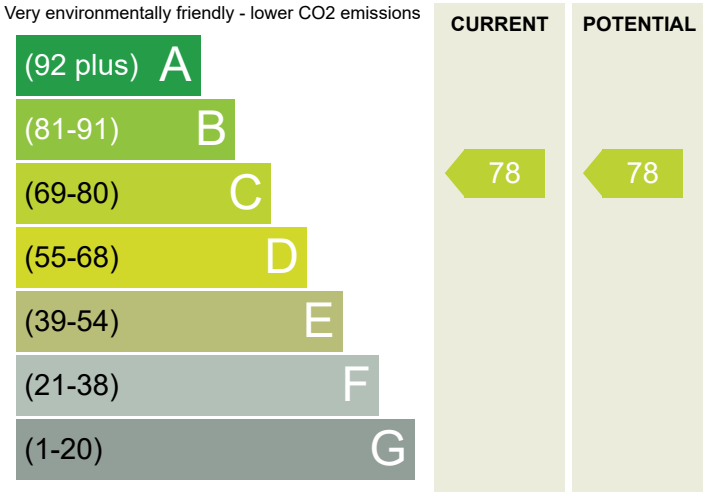
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

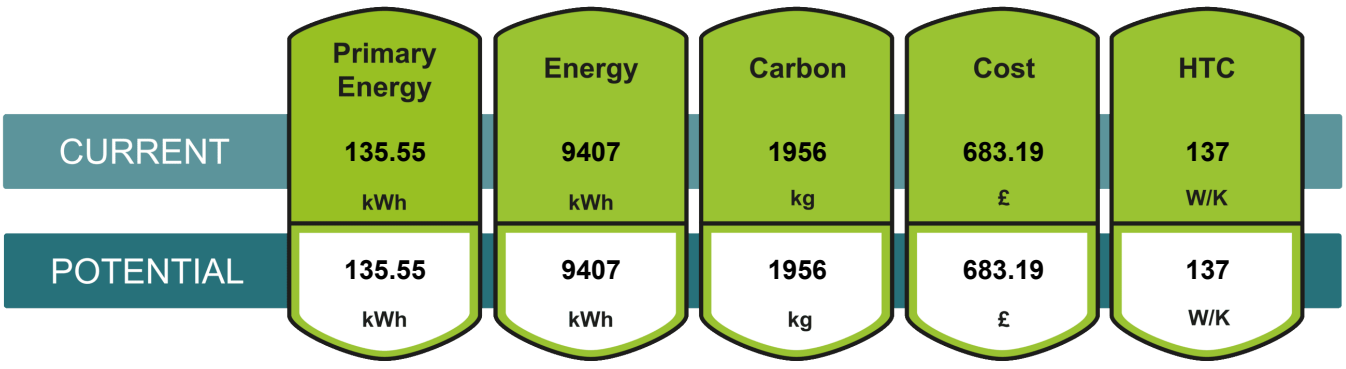
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£43	£43	You could save £0
Heating	£477	£477	
Hot Water	£163	£163	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£683	£683	

Estimated energy use and potential savings

Space Heating
6214
kWh per year

Water Heating
2913
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 1	Issued on Date	01/10/2024
Assessment Reference	Apt. 1	Prop Type Ref	Detached Flat
Property			

SAP Rating	77 C	DER	26.15	TER	
Environmental	78 C	% DER < TER			N/A
CO_2 Emissions (t/year)	1.96	DFEE	78.33	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	143.40	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Southeast (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1	
Type	Solid Wall	
Construction	Other	
U-value	0.30	W/m²K U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	56.02	m²

Comments

Heat Loss Floors

Dwelling Sign Off Report

Description	Heatloss Floor 1		
Type	Ground Floor - Timber		
Construction	Other		
U-value	0.25	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	79.24	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NE1	New Glazing	External Wall 1	North East	5.36
W NE2 Upgrade	New Glazing	External Wall 1	North East	2.68

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1

SAP table

Fuel Type	Mains gas	
Winter Efficiency	84.00	%
Summer Efficiency	75.00	%
Model Name		
Manufacturer		
System Type		
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Flow Temperature Value		

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2 None

Secondary Heating None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Dwelling Sign Off Report

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 2	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 2	**Prop Type Ref**	
Property			

SAP Rating	77 C	**DER**	28.83	**TER**	
Environmental	79 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.54	**DFEE**	81.28	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	158.27	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	20.65 m	56.79 m²	3.10 m

8.0 Living Area	24.78	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	51.55	44.83	0.00	None	6.72	Enter Gross Area

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	56.79

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Other	0.25	None	0.00	0.00	56.79

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SE1	New Glazing	External Wall 1	South East	1.36	0
W NE1 - Upgrade	New Glazing	External Wall 1	North East	5.36	0

Summary for Input Data

elmhurst energy

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type

Heat source 1	None
Heat source 2	None
Heat source 3	None
Heat source 4	None
Heat source 5	None

27.0 Secondary Heating	None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 2	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 2	**Prop Type Ref**	
Property			

SAP Rating	77 C	**DER**	28.83	**TER**	
Environmental	79 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.54	**DFEE**	81.28	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	158.27	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.7900	(1b)	x 3.1000	(2b) =	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	176.0490	(5)

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2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8636 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9359	0.9176	0.8992	0.8075	0.7891	0.6974	0.6974	0.6790	0.7341	0.7891	0.8258	0.8625	(22b)
Effective ac	0.9380	0.9210	0.9043	0.8260	0.8114	0.7432	0.7432	0.7305	0.7694	0.8114	0.8410	0.8720	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Total net area of external elements Aum(A, m2)			108.3400					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	36.5556			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		21.6680 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	58.2236 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4933	53.5052	52.5367	47.9877	47.1366	43.1745	43.1745	42.4408	44.7006	47.1366	48.8584	50.6584	(38)
Heat transfer coeff	112.7169	111.7288	110.7603	106.2113	105.3602	101.3981	101.3981	100.6644	102.9242	105.3602	107.0819	108.8820	(39)
Average = Sum(39)m / 12 =												106.2072	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.9848	1.9674	1.9503	1.8702	1.8553	1.7855	1.7855	1.7726	1.8124	1.8553	1.8856	1.9173	(40)
HLP (average)												1.8702	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8896	(42)
Hot water usage for mixer showers													
	62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)
Average daily hot water use (litres/day)												88.7832	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)										Total = Sum(45)m =		1474.8031	
Distribution loss (46)m = 0.15 x (45)m													
	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3140	43.5386	46.8731	43.4542	43.2836	40.2103	40.9234	42.2485	42.2328	45.4549	45.9233	49.1914	(61)
Total heat required for water heating calculated for each month													
	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(64)
										Total per year (kWh/year) = Sum(64)m =		2007.4514	(64)
12Total per year (kWh/year)												2007	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	63.2886	55.6721	58.7248	50.9716	48.8401	43.3890	42.5246	44.6954	45.6705	51.6103	55.5935	62.5536	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	89.8454	99.4717	89.8454	92.8403	89.8454	92.8403	89.8454	89.8454	92.8403	89.8454	92.8403	89.8454	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	164.7851	166.4950	162.1860	153.0126	141.4328	130.5494	123.2787	121.5687	125.8778	135.0512	146.6309	157.5143	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	85.0653	82.8454	78.9312	70.7939	65.6453	60.2624	57.1567	60.0744	63.4313	69.3687	77.2132	84.0775	(72)
Total internal gains													
	398.0395	407.1558	389.3064	374.9905	355.2672	334.9959	321.6246	322.8323	333.4930	352.6090	375.0281	389.7809	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)

Solar gains	46.5653	87.7819	142.5887	214.3569	274.4926	287.6368	271.0165	223.8396	167.0771	103.0793	57.3159	38.8528	(83)
Total gains	444.6049	494.9377	531.8950	589.3474	629.7598	622.6327	592.6411	546.6719	500.5701	455.6883	432.3440	428.6337	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9881	35.2975	35.6062	37.1312	37.4311	38.8937	38.8937	39.1772	38.3170	37.4311	36.8293	36.2204	
alpha	3.3325	3.3532	3.3737	3.4754	3.4954	3.5929	3.5929	3.6118	3.5545	3.4954	3.4553	3.4147	
util living area													
	0.9938	0.9904	0.9838	0.9628	0.9117	0.7982	0.6607	0.7141	0.8931	0.9723	0.9901	0.9946	(86)
MIT	18.6397	18.8499	19.2162	19.8023	20.3214	20.7429	20.9077	20.8768	20.5568	19.9082	19.2349	18.6766	(87)
Th 2	19.3435	19.3552	19.3666	19.4212	19.4316	19.4802	19.4802	19.4893	19.4614	19.4316	19.4107	19.3891	(88)
util rest of house													
	0.9915	0.9868	0.9771	0.9458	0.8654	0.6851	0.4723	0.5343	0.8168	0.9562	0.9856	0.9926	(89)
MIT 2	17.2874	17.5041	17.8751	18.4866	18.9806	19.3647	19.4597	19.4573	19.2206	18.6039	17.9257	17.3547	(90)
Living area fraction									fLA = Living area / (4) =			0.4363	(91)
MIT	17.8775	18.0913	18.4603	19.0607	19.5656	19.9661	20.0915	20.0766	19.8036	19.1730	18.4969	17.9315	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.7275	17.9413	18.3103	18.9107	19.4156	19.8161	19.9415	19.9266	19.6536	19.0230	18.3469	17.7815	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9880	0.9822	0.9709	0.9383	0.8648	0.7145	0.5361	0.5939	0.8291	0.9502	0.9812	0.9896	(94)
Useful gains	439.2821	486.1098	516.4351	552.9621	544.5999	444.8840	317.7389	324.6936	414.9978	432.9798	424.2173	424.1793	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1513.5057	1457.0893	1308.1108	1063.2519	812.9189	528.8985	338.8214	355.0078	571.6044	887.4531	1204.3451	1478.7815	(97)
Space heating kWh	799.2224	652.4982	589.0067	367.4087	199.6294	0.0000	0.0000	0.0000	0.0000	338.1281	561.6920	784.6240	(98a)
Space heating requirement - total per year (kWh/year)												4292.2096	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	799.2224	652.4982	589.0067	367.4087	199.6294	0.0000	0.0000	0.0000	0.0000	338.1281	561.6920	784.6240	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4292.2096	
Space heating per m2											(98c) / (4) =	75.5804	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	799.2224	652.4982	589.0067	367.4087	199.6294	0.0000	0.0000	0.0000	0.0000	338.1281	561.6920	784.6240	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	951.4553	776.7836	701.1985	437.3913	237.6540	0.0000	0.0000	0.0000	0.0000	402.5335	668.6810	934.0762	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(64)
Efficiency of water heater												75.0000	(216)
(217)m	82.0100	81.8916	81.6276	80.9993	79.7762	75.0000	75.0000	75.0000	75.0000	80.8008	81.6366	81.9986	(217)
Fuel for water heating, kWh/month	247.0157	217.6507	230.6158	202.5697	197.5865	187.2934	184.0634	193.2065	197.1118	206.0588	218.7657	244.3170	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.9865	12.0227	10.8251	7.9310	6.1261	5.0051	5.5884	7.2641	9.4353	12.3796	13.9827	15.4030	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5109.7733	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2526.2550	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	120.9497	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7871.9780	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5109.7733	0.2100	1073.0524	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2526.2550	0.2100	530.5136	(264)
Space and water heating			1603.5659	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	120.9497	0.1443	17.4568	(268)
Total CO2, kg/year			1636.9746	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			28.8300	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	5109.7733	1.1300	5774.0438	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2526.2550	1.1300	2854.6682	(278)
Space and water heating			8628.7120	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	120.9497	1.5338	185.5166	(282)
Total Primary energy kWh/year			8988.2007	(286)
Dwelling Primary energy Rate (DPER)			158.2700	(287)

Full SAP Calculation Printout

Property Reference	Apt. 2	Issued on Date	01/10/2024
Assessment Reference	Apt. 2	Prop Type Ref	
Property			

SAP Rating	77 C	DER	28.83	TER	
Environmental	79 C	% DER < TER			N/A
CO_2 Emissions (t/year)	1.54	DFEE	81.28	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	158.27	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.7900	(1b)	x 3.1000	(2b) =	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		176.0490	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8636 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9359	0.9176	0.8992	0.8075	0.7891	0.6974	0.6974	0.6790	0.7341	0.7891	0.8258	0.8625	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9380	0.9210	0.9043	0.8260	0.8114	0.7432	0.7432	0.7305	0.7694	0.8114	0.8410	0.8720	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Total net area of external elements Aum(A, m2)			108.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.5556			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		21.6680 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	58.2236 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4933	53.5052	52.5367	47.9877	47.1366	43.1745	43.1745	42.4408	44.7006	47.1366	48.8584	50.6584	(38)
Heat transfer coeff	112.7169	111.7288	110.7603	106.2113	105.3602	101.3981	101.3981	100.6644	102.9242	105.3602	107.0819	108.8820	(39)
Average = Sum(39)m / 12 =												106.2072	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9848	1.9674	1.9503	1.8702	1.8553	1.7855	1.7855	1.7726	1.8124	1.8553	1.8856	1.9173	(40)
HLP (average)												1.8702	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8896	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	24.1627	23.8039	23.2986	22.3668	21.6691	20.8955	20.4776	20.9794	21.5258	22.3536	23.3045	24.0811	(42b)
Hot water usage for other uses													
	33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)
Average daily hot water use (litres/day)												53.2947	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	58.1439	56.5494	54.8084	52.6410	50.7076	48.6983	48.2804	50.0179	51.7999	53.8634	56.0500	58.0622	(44)
Energy conte	92.0858	80.5256	84.2384	72.0628	68.2622	59.8802	58.3910	61.9326	63.8745	73.0922	79.8536	90.9114	(45)
Energy content (annual)										Total = Sum(45)m =		885.1103	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	78.2729	68.4468	71.6027	61.2534	58.0228	50.8982	49.6323	52.6427	54.2933	62.1283	67.8755	77.2747	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	78.2729	68.4468	71.6027	61.2534	58.0228	50.8982	49.6323	52.6427	54.2933	62.1283	67.8755	77.2747	(64)
										Total per year (kWh/year) = Sum(64)m =		752.3438	(64)
12Total per year (kWh/year)												752	(64)
Electric shower(s)													
	44.7679	39.8885	43.5567	41.5657	42.3456	40.3936	41.7401	42.3456	41.5657	43.5567	42.7377	44.7679	(64a)
							Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					509.2317	(64a)
Heat gains from water heating, kWh/month													
	30.7602	27.0838	28.7899	25.7048	25.0921	22.8230	22.8431	23.7471	23.9648	26.4213	27.6533	30.5106	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	89.8454	99.4717	89.8454	92.8403	89.8454	92.8403	89.8454	89.8454	92.8403	89.8454	92.8403	89.8454	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	164.7851	166.4950	162.1860	153.0126	141.4328	130.5494	123.2787	121.5687	125.8778	135.0512	146.6309	157.5143	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	41.3443	40.3033	38.6960	35.7011	33.7260	31.6985	30.7031	31.9181	33.2844	35.5125	38.4074	41.0089	(72)
Total internal gains													
	347.3185	357.6137	342.0712	332.8976	316.3479	306.4320	295.1709	294.6760	303.3461	311.7528	329.2223	339.7124	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)

Solar gains	46.5653	87.7819	142.5887	214.3569	274.4926	287.6368	271.0165	223.8396	167.0771	103.0793	57.3159	38.8528	(83)
Total gains	393.8839	445.3956	484.6598	547.2545	590.8405	594.0688	566.1874	518.5156	470.4232	414.8321	386.5382	378.5652	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9881	35.2975	35.6062	37.1312	37.4311	38.8937	38.8937	39.1772	38.3170	37.4311	36.8293	36.2204	
alpha	3.3325	3.3532	3.3737	3.4754	3.4954	3.5929	3.5929	3.6118	3.5545	3.4954	3.4553	3.4147	
util living area													
	0.9957	0.9930	0.9877	0.9698	0.9245	0.8154	0.6813	0.7369	0.9078	0.9789	0.9930	0.9963	(86)
MIT	18.5584	18.7712	19.1428	19.7411	20.2747	20.7217	20.8978	20.8627	20.5231	19.8464	19.1613	18.5952	(87)
Th 2	19.3435	19.3552	19.3666	19.4212	19.4316	19.4802	19.4802	19.4893	19.4614	19.4316	19.4107	19.3891	(88)
util rest of house													
	0.9941	0.9903	0.9825	0.9555	0.8830	0.7059	0.4915	0.5579	0.8381	0.9662	0.9898	0.9950	(89)
MIT 2	17.2067	17.4263	17.8033	18.4291	18.9416	19.3525	19.4569	19.4525	19.1960	18.5455	17.8532	17.2739	(90)
Living area fraction										fLA = Living area / (4) =		0.4363	(91)
MIT	17.7965	18.0132	18.3878	19.0016	19.5233	19.9499	20.0856	20.0678	19.7750	19.1132	18.4240	17.8504	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.7965	18.0132	18.3878	19.0016	19.5233	19.9499	20.0856	20.0678	19.7750	19.1132	18.4240	17.8504	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9918	0.9871	0.9780	0.9504	0.8860	0.7454	0.5755	0.6361	0.8562	0.9625	0.9868	0.9930	(94)
Useful gains	390.6419	439.6441	474.0123	520.0835	523.5136	442.8393	325.8359	329.8050	402.7528	399.2925	381.4386	375.9148	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1521.2850	1465.1170	1316.6941	1072.8996	824.2631	542.4732	353.4358	369.2201	584.0992	896.9473	1212.5923	1486.2869	(97)
Space heating kWh													
	841.1985	689.1178	626.9552	398.0276	223.7576	0.0000	0.0000	0.0000	0.0000	370.2552	598.4306	826.1168	(98a)
Space heating requirement - total per year (kWh/year)												4573.8593	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	841.1985	689.1178	626.9552	398.0276	223.7576	0.0000	0.0000	0.0000	0.0000	370.2552	598.4306	826.1168	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4573.8593	
Space heating per m2											(98c) / (4) =	80.5399	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	953.1422	750.3460	765.0494	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6203	0.7066	0.6583	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	591.2792	530.2158	503.6566	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	656.6271	625.9866	572.0545	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	47.0505	71.2535	50.8880	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	11.7626	17.8134	12.7220	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												42.2980	(107)
Energy for space heating												80.5399	(99)
Energy for space cooling												0.7448	(108)
Total												81.2847	(109)
Fabric Energy Efficiency (DFEE)												81.3	(109)

Full SAP Calculation Printout

Property Reference	Apt. 2	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 2	**Prop Type Ref**	
Property			

SAP Rating	77 C	**DER**	28.83	**TER**	
Environmental	79 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.54	**DFEE**	81.28	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	158.27	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.7900	(1b)	x 3.1000	(2b) =	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	176.0490	(5)

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2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8636 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9359	0.9176	0.8992	0.8075	0.7891	0.6974	0.6974	0.6790	0.7341	0.7891	0.8258	0.8625	(22b)
Effective ac	0.9380	0.9210	0.9043	0.8260	0.8114	0.7432	0.7432	0.7305	0.7694	0.8114	0.8410	0.8720	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Total net area of external elements Aum(A, m2)			108.3400					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	36.5556			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		21.6680 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	58.2236 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4933	53.5052	52.5367	47.9877	47.1366	43.1745	43.1745	42.4408	44.7006	47.1366	48.8584	50.6584	(38)
Heat transfer coeff	112.7169	111.7288	110.7603	106.2113	105.3602	101.3981	101.3981	100.6644	102.9242	105.3602	107.0819	108.8820	(39)
Average = Sum(39)m / 12 =												106.2072	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.9848	1.9674	1.9503	1.8702	1.8553	1.7855	1.7855	1.7726	1.8124	1.8553	1.8856	1.9173	(40)
HLP (average)												1.8702	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8896	(42)
Hot water usage for mixer showers													
	62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)
Average daily hot water use (litres/day)												88.7832	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)										Total = Sum(45)m =		1474.8031	
Distribution loss (46)m = 0.15 x (45)m													
	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3140	43.5386	46.8731	43.4542	43.2836	40.2103	40.9234	42.2485	42.2328	45.4549	45.9233	49.1914	(61)
Total heat required for water heating calculated for each month													
	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(64)
										Total per year (kWh/year) = Sum(64)m =		2007.4514	(64)
12Total per year (kWh/year)												2007	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	63.2886	55.6721	58.7248	50.9716	48.8401	43.3890	42.5246	44.6954	45.6705	51.6103	55.5935	62.5536	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	94.4790	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	89.8454	99.4717	89.8454	92.8403	89.8454	92.8403	89.8454	89.8454	92.8403	89.8454	92.8403	89.8454	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	164.7851	166.4950	162.1860	153.0126	141.4328	130.5494	123.2787	121.5687	125.8778	135.0512	146.6309	157.5143	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	32.4479	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	85.0653	82.8454	78.9312	70.7939	65.6453	60.2624	57.1567	60.0744	63.4313	69.3687	77.2132	84.0775	(72)
Total internal gains													
	398.0395	407.1558	389.3064	374.9905	355.2672	334.9959	321.6246	322.8323	333.4930	352.6090	375.0281	389.7809	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)

Solar gains	46.5653	87.7819	142.5887	214.3569	274.4926	287.6368	271.0165	223.8396	167.0771	103.0793	57.3159	38.8528	(83)
Total gains	444.6049	494.9377	531.8950	589.3474	629.7598	622.6327	592.6411	546.6719	500.5701	455.6883	432.3440	428.6337	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9881	35.2975	35.6062	37.1312	37.4311	38.8937	38.8937	39.1772	38.3170	37.4311	36.8293	36.2204	
alpha	3.3325	3.3532	3.3737	3.4754	3.4954	3.5929	3.5929	3.6118	3.5545	3.4954	3.4553	3.4147	
util living area													
	0.9938	0.9904	0.9838	0.9628	0.9117	0.7982	0.6607	0.7141	0.8931	0.9723	0.9901	0.9946	(86)
MIT	18.6397	18.8499	19.2162	19.8023	20.3214	20.7429	20.9077	20.8768	20.5568	19.9082	19.2349	18.6766	(87)
Th 2	19.3435	19.3552	19.3666	19.4212	19.4316	19.4802	19.4802	19.4893	19.4614	19.4316	19.4107	19.3891	(88)
util rest of house													
	0.9915	0.9868	0.9771	0.9458	0.8654	0.6851	0.4723	0.5343	0.8168	0.9562	0.9856	0.9926	(89)
MIT 2	17.2874	17.5041	17.8751	18.4866	18.9806	19.3647	19.4597	19.4573	19.2206	18.6039	17.9257	17.3547	(90)
Living area fraction									fLA = Living area / (4) =			0.4363	(91)
MIT	17.8775	18.0913	18.4603	19.0607	19.5656	19.9661	20.0915	20.0766	19.8036	19.1730	18.4969	17.9315	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.7275	17.9413	18.3103	18.9107	19.4156	19.8161	19.9415	19.9266	19.6536	19.0230	18.3469	17.7815	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9880	0.9822	0.9709	0.9383	0.8648	0.7145	0.5361	0.5939	0.8291	0.9502	0.9812	0.9896	(94)
Useful gains	439.2821	486.1098	516.4351	552.9621	544.5999	444.8840	317.7389	324.6936	414.9978	432.9798	424.2173	424.1793	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1513.5057	1457.0893	1308.1108	1063.2519	812.9189	528.8985	338.8214	355.0078	571.6044	887.4531	1204.3451	1478.7815	(97)
Space heating kWh	799.2224	652.4982	589.0067	367.4087	199.6294	0.0000	0.0000	0.0000	0.0000	338.1281	561.6920	784.6240	(98a)
Space heating requirement - total per year (kWh/year)												4292.2096	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	799.2224	652.4982	589.0067	367.4087	199.6294	0.0000	0.0000	0.0000	0.0000	338.1281	561.6920	784.6240	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4292.2096	
Space heating per m2											(98c) / (4) =	75.5804	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	799.2224	652.4982	589.0067	367.4087	199.6294	0.0000	0.0000	0.0000	0.0000	338.1281	561.6920	784.6240	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	951.4553	776.7836	701.1985	437.3913	237.6540	0.0000	0.0000	0.0000	0.0000	402.5335	668.6810	934.0762	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(64)
Efficiency of water heater												75.0000	(216)
(217)m	82.0100	81.8916	81.6276	80.9993	79.7762	75.0000	75.0000	75.0000	75.0000	80.8008	81.6366	81.9986	(217)
Fuel for water heating, kWh/month	247.0157	217.6507	230.6158	202.5697	197.5865	187.2934	184.0634	193.2065	197.1118	206.0588	218.7657	244.3170	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.9865	12.0227	10.8251	7.9310	6.1261	5.0051	5.5884	7.2641	9.4353	12.3796	13.9827	15.4030	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5109.7733	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2526.2550	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	120.9497	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7871.9780	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5109.7733	0.2100	1073.0524	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2526.2550	0.2100	530.5136	(264)
Space and water heating			1603.5659	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	120.9497	0.1443	17.4568	(268)
Total CO2, kg/year			1636.9746	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			28.8300	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	5109.7733	1.1300	5774.0438	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2526.2550	1.1300	2854.6682	(278)
Space and water heating			8628.7120	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	120.9497	1.5338	185.5166	(282)
Total Primary energy kWh/year			8988.2007	(286)
Dwelling Primary energy Rate (DPER)			158.2700	(287)

Full SAP Calculation Printout

Property Reference	Apt. 2	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 2	**Prop Type Ref**	
Property			

SAP Rating	77 C	**DER**	28.83	**TER**	
Environmental	79 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.54	**DFEE**	81.28	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	158.27	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		56.7900 (1b)	x	3.1000 (2b)	=	176.0490	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	176.0490	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8636	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9359	0.9176	0.8992	0.8075	0.7891	0.6974	0.6974	0.6790	0.7341	0.7891	0.8258	0.8625	(22b)
Effective ac	0.9380	0.9210	0.9043	0.8260	0.8114	0.7432	0.7432	0.7305	0.7694	0.8114	0.8410	0.8720	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Total net area of external elements Aum(A, m2)			108.3400					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	36.5556			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	21.6680	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	58.2236	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4933	53.5052	52.5367	47.9877	47.1366	43.1745	43.1745	42.4408	44.7006	47.1366	48.8584	50.6584	(38)
Heat transfer coeff	112.7169	111.7288	110.7603	106.2113	105.3602	101.3981	101.3981	100.6644	102.9242	105.3602	107.0819	108.8820	(39)
Average = Sum(39)m / 12 =												106.2072	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.9848	1.9674	1.9503	1.8702	1.8553	1.7855	1.7855	1.7726	1.8124	1.8553	1.8856	1.9173	(40)
HLP (average)												1.8702	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8896	(42)
Hot water usage for mixer showers													
	62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)
Average daily hot water use (litres/day)												88.7832	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)										Total = Sum(45)m =		1474.8031	
Distribution loss (46)m = 0.15 x (45)m													
	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3140	43.5386	46.8731	43.4542	43.2836	40.2103	40.9234	42.2485	42.2328	45.4549	45.9233	49.1914	(61)
Total heat required for water heating calculated for each month													
	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(64)
									Total per year (kWh/year) = Sum(64)m =			2007.4514	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
							Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					0.0000	(64a)
Heat gains from water heating, kWh/month													
	63.2886	55.6721	58.7248	50.9716	48.8401	43.3890	42.5246	44.6954	45.6705	51.6103	55.5935	62.5536	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.1217	15.2073	12.3674	9.3629	6.9989	5.9088	6.3846	8.2990	11.1389	14.1434	16.5074	17.5975	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	245.9478	248.5000	242.0686	228.3770	211.0937	194.8499	183.9980	181.4459	187.8772	201.5689	218.8522	235.0960	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	85.0653	82.8454	78.9312	70.7939	65.6453	60.2624	57.1567	60.0744	63.4313	69.3687	77.2132	84.0775	(72)
Total internal gains													
	441.1535	439.5713	426.3860	401.5525	376.7565	347.0398	333.5581	335.8379	348.4661	378.0996	405.5914	429.7896	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)

Solar gains	46.5653	87.7819	142.5887	214.3569	274.4926	287.6368	271.0165	223.8396	167.0771	103.0793	57.3159	38.8528	(83)
Total gains	487.7189	527.3532	568.9746	615.9094	651.2491	634.6766	604.5746	559.6775	515.5432	481.1789	462.9073	468.6425	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9881	35.2975	35.6062	37.1312	37.4311	38.8937	38.8937	39.1772	38.3170	37.4311	36.8293	36.2204	
alpha	3.3325	3.3532	3.3737	3.4754	3.4954	3.5929	3.5929	3.6118	3.5545	3.4954	3.4553	3.4147	
util living area													
	0.9918	0.9884	0.9803	0.9580	0.9043	0.7909	0.6517	0.7037	0.8856	0.9676	0.9878	0.9929	(86)
MIT	18.7083	18.9009	19.2731	19.8401	20.3461	20.7513	20.9118	20.8827	20.5728	19.9459	19.2835	18.7411	(87)
Th 2	19.3435	19.3552	19.3666	19.4212	19.4316	19.4802	19.4802	19.4893	19.4614	19.4316	19.4107	19.3891	(88)
util rest of house													
	0.9887	0.9841	0.9724	0.9392	0.8554	0.6765	0.4641	0.5240	0.8062	0.9492	0.9824	0.9903	(89)
MIT 2	17.3553	17.5543	17.9303	18.5217	19.0008	19.3694	19.4608	19.4592	19.2319	18.6391	17.9733	17.4187	(90)
Living area fraction										fLA = Living area / (4) =		0.4363	(91)
MIT	17.9457	18.1419	18.5162	19.0970	19.5878	19.9724	20.0939	20.0803	19.8170	19.2093	18.5450	17.9957	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.7957	17.9919	18.3662	18.9470	19.4378	19.8224	19.9439	19.9303	19.6670	19.0593	18.3950	17.8457	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9845	0.9789	0.9655	0.9315	0.8557	0.7067	0.5277	0.5837	0.8197	0.9431	0.9773	0.9866	(94)
Useful gains	480.1833	516.2000	549.3255	573.7471	557.2534	448.5097	319.0164	326.6939	422.5789	453.7939	452.4167	462.3648	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1521.1920	1462.7395	1314.3045	1067.1049	815.2602	529.5432	339.0664	355.3797	572.9825	891.2764	1209.4916	1485.7752	(97)
Space heating kWh	774.5105	636.0745	569.1444	355.2176	191.9570	0.0000	0.0000	0.0000	0.0000	325.4870	545.0939	761.4173	(98a)
Space heating requirement - total per year (kWh/year)												4158.9023	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	774.5105	636.0745	569.1444	355.2176	191.9570	0.0000	0.0000	0.0000	0.0000	325.4870	545.0939	761.4173	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4158.9023	
Space heating per m2											(98c) / (4) =	73.2330	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	774.5105	636.0745	569.1444	355.2176	191.9570	0.0000	0.0000	0.0000	0.0000	325.4870	545.0939	761.4173	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	922.0363	757.2316	677.5528	422.8781	228.5203	0.0000	0.0000	0.0000	0.0000	387.4845	648.9213	906.4492	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.9609	81.8501	81.5672	80.9314	79.6882	75.0000	75.0000	75.0000	75.0000	80.7219	81.5840	81.9515	(217)
Fuel for water heating, kWh/month	247.1637	217.7609	230.7866	202.7396	197.8046	187.2934	184.0634	193.2065	197.1118	206.2604	218.9069	244.4575	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.9865	12.0227	10.8251	7.9310	6.1261	5.0051	5.5884	7.2641	9.4353	12.3796	13.9827	15.4030	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4951.0741	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2527.5552	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	120.9497	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7714.5790	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4951.0741	3.6400	180.2191	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2527.5552	3.6400	92.0030	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	120.9497	16.4900	19.9446	(250)
Additional standing charges			92.0000	(251)
Total energy cost			403.1302	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.4257	(257)
SAP value		76.8886	
SAP rating (Section 12)		77	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4951.0741	0.2100	1039.7256	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2527.5552	0.2100	530.7866	(264)
Space and water heating			1570.5122	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	120.9497	0.1443	17.4568	(268)
Total CO2, kg/year			1603.9209	(272)
CO2 emissions per m2			28.2400	(273)
EI value			78.8854	
EI rating			79	(274)
EI band			C	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		56.7900 (1b)	x	3.1000 (2b)	=	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	176.0490	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8636	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8809	0.8625	0.8442	0.7708	0.7524	0.6790	0.6790	0.6790	0.6790	0.7708	0.7891	0.8258	(22b)
Effective ac	0.8880	0.8720	0.8563	0.7970	0.7831	0.7305	0.7305	0.7305	0.7305	0.7970	0.8114	0.8410	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Total net area of external elements Aum(A, m2)			108.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.5556			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		21.6680	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	58.2236	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.5878	50.6584	49.7486	46.3050	45.4931	42.4408	42.4408	42.4408	42.4408	46.3050	47.1366	48.8584	(38)
Heat transfer coeff													
	109.8114	108.8820	107.9722	104.5286	103.7166	100.6644	100.6644	100.6644	100.6644	104.5286	105.3602	107.0819	(39)
Average = Sum(39)m / 12 =												104.5449	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9336	1.9173	1.9013	1.8406	1.8263	1.7726	1.7726	1.7726	1.7726	1.8406	1.8553	1.8856	(40)
HLP (average)												1.8409	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8896	(42)
Hot water usage for mixer showers													
	62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)
Average daily hot water use (litres/day)												88.7832	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)										Total = Sum(45)m =		1474.8031	
Distribution loss (46)m = 0.15 x (45)m													
	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3140	43.5386	46.8731	43.4542	43.2836	40.2103	40.9234	42.2485	42.2328	45.4549	45.9233	49.1914	(61)
Total heat required for water heating calculated for each month													
	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(64)
										Total per year (kWh/year) = Sum(64)m =		2007.4514	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	63.2886	55.6721	58.7248	50.9716	48.8401	43.3890	42.5246	44.6954	45.6705	51.6103	55.5935	62.5536	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.1217	15.2073	12.3674	9.3629	6.9989	5.9088	6.3846	8.2990	11.1389	14.1434	16.5074	17.5975	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	245.9478	248.5000	242.0686	228.3770	211.0937	194.8499	183.9980	181.4459	187.8772	201.5689	218.8522	235.0960	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	85.0653	82.8454	78.9312	70.7939	65.6453	60.2624	57.1567	60.0744	63.4313	69.3687	77.2132	84.0775	(72)
Total internal gains													
	441.1535	439.5713	426.3860	401.5525	376.7565	347.0398	333.5581	335.8379	348.4661	378.0996	405.5914	429.7896	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)

Solar gains	42.9834	82.9051	141.1034	217.2150	273.0630	291.9514	266.7147	216.7110	167.0771	101.5175	53.8422	37.0027	(83)
Total gains	484.1369	522.4764	567.4893	618.7675	649.8195	638.9912	600.2727	552.5489	515.5432	479.6171	459.4336	466.7923	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.9139	36.2204	36.5256	37.7289	38.0243	39.1772	39.1772	39.1772	39.1772	37.7289	37.4311	36.8293	
alpha	3.3943	3.4147	3.4350	3.5153	3.5350	3.6118	3.6118	3.6118	3.6118	3.5153	3.4954	3.4553	
util living area													
	0.9914	0.9880	0.9794	0.9549	0.8953	0.7802	0.6725	0.7188	0.8824	0.9668	0.9869	0.9924	(86)
MIT	18.8361	19.0058	19.3592	19.9051	20.4090	20.7700	20.8993	20.8712	20.5937	19.9723	19.3792	18.8479	(87)
Th 2	19.3779	19.3891	19.4000	19.4417	19.4516	19.4893	19.4893	19.4893	19.4893	19.4417	19.4316	19.4107	(88)
util rest of house													
	0.9881	0.9835	0.9711	0.9346	0.8416	0.6624	0.4937	0.5437	0.8027	0.9479	0.9810	0.9896	(89)
MIT 2	17.5057	17.6815	18.0382	18.5988	19.0719	19.3895	19.4644	19.4543	19.2711	18.6719	18.0827	17.5397	(90)

Living area fraction										fLA = Living area / (4) =		0.4363	(91)
MIT	18.0862	18.2593	18.6146	19.1688	19.6553	19.9919	20.0905	20.0726	19.8482	19.2393	18.6484	18.1105	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9362	18.1093	18.4646	19.0188	19.5053	19.8419	19.9405	19.9226	19.6982	19.0893	18.4984	17.9605	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9839	0.9783	0.9643	0.9272	0.8439	0.6944	0.5534	0.6013	0.8166	0.9419	0.9758	0.9859	(94)
Useful gains	476.3395	511.1486	547.2029	573.7414	548.3985	443.6884	332.1873	332.2546	420.9900	451.7379	448.3326	460.1874	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1453.4905	1405.5939	1270.2520	1036.7968	778.4262	517.6061	356.4053	364.6642	563.5394	876.9215	1158.7926	1430.6711	(97)
Space heating kWh													
	727.0003	601.0673	537.9485	333.3999	171.1406	0.0000	0.0000	0.0000	0.0000	316.3366	511.5312	722.0398	(98a)
Space heating requirement - total per year (kWh/year)												3920.4642	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	727.0003	601.0673	537.9485	333.3999	171.1406	0.0000	0.0000	0.0000	0.0000	316.3366	511.5312	722.0398	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3920.4642	
Space heating per m2											(98c) / (4) =	69.0344	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	727.0003	601.0673	537.9485	333.3999	171.1406	0.0000	0.0000	0.0000	0.0000	316.3366	511.5312	722.0398	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	865.4766	715.5563	640.4148	396.9046	203.7388	0.0000	0.0000	0.0000	0.0000	376.5912	608.9657	859.5712	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8593	81.7562	81.4659	80.8020	79.4301	75.0000	75.0000	75.0000	75.0000	80.6622	81.4700	81.8663	(217)
Fuel for water heating, kWh/month													
	247.4704	218.0113	231.0738	203.0644	198.4474	187.2934	184.0634	193.2065	197.1118	206.4130	219.2131	244.7120	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.9865	12.0227	10.8251	7.9310	6.1261	5.0051	5.5884	7.2641	9.4353	12.3796	13.9827	15.4030	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4667.2193	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2530.0803	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	120.9497	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7433.2493	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4667.2193	5.6000	261.3643	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	2530.0803	5.6000	141.6845	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	120.9497	26.0600	31.5195	(250)
Additional standing charges			99.0000	(251)
Total energy cost			563.5373	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4667.2193	0.2100	980.1160	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2530.0803	0.2100	531.3169	(264)
Space and water heating			1511.4329	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	120.9497	0.1443	17.4568	(268)
Total CO2, kg/year			1544.8416	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4667.2193	1.1300	5273.9578	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2530.0803	1.1300	2858.9908	(278)
Space and water heating			8132.9486	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	120.9497	1.5338	185.5166	(282)
Total Primary energy kWh/year			8492.4372	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 2

Current energy efficiency rating: C 77
Current environmental impact rating: C 79

N Solar water heating — Not applicable
U Solar photovoltaic panels — Not applicable
V2 Wind turbine — Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: C 77
Potential environmental impact rating: C 79

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£61	£61	£0
Mains gas	£502	£502	£0
Space heating	£390	£390	£0
Water heating	£142	£142	£0
Lighting	£32	£32	£0
Total cost of fuels	£563	£563	£0
Total cost of uses	£564	£564	£0
Delivered energy	131 kWh/m²	131 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.5 tonnes	1.5 tonnes	0.0 tonnes
CO2 emissions per m²	27 kg/m²	27 kg/m²	0 kg/m²
Primary energy	150 kWh/m²	150 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		56.7900 (1b)	x	3.1000 (2b)	=	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	176.0490	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8636	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9359	0.9176	0.8992	0.8075	0.7891	0.6974	0.6974	0.6790	0.7341	0.7891	0.8258	0.8625	(22b)
Effective ac	0.9380	0.9210	0.9043	0.8260	0.8114	0.7432	0.7432	0.7305	0.7694	0.8114	0.8410	0.8720	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Total net area of external elements Aum(A, m2)			108.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.5556			(33)
Party Ceiling 1			56.7900					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							21.6680	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		58.2236	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.4933	53.5052	52.5367	47.9877	47.1366	43.1745	43.1745	42.4408	44.7006	47.1366	48.8584	50.6584	(38)
Heat transfer coeff	112.7169	111.7288	110.7603	106.2113	105.3602	101.3981	101.3981	100.6644	102.9242	105.3602	107.0819	108.8820	(39)
Average = Sum(39)m / 12 =												106.2072	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9848	1.9674	1.9503	1.8702	1.8553	1.7855	1.7855	1.7726	1.8124	1.8553	1.8856	1.9173	(40)
HLP (average)												1.8702	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.8896	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)

Average daily hot water use (litres/day)	88.7832	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)										Total = Sum(45)m =		1474.8031	
Distribution loss (46)m = 0.15 x (45)m	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3140	43.5386	46.8731	43.4542	43.2836	40.2103	40.9234	42.2485	42.2328	45.4549	45.9233	49.1914	(61)
Total heat required for water heating calculated for each month	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(64)
									Total per year (kWh/year) = Sum(64)m =			2007.4514	(64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)

Heat gains from water heating, kWh/month

63.2886	55.6721	58.7248	50.9716	48.8401	43.3890	42.5246	44.6954	45.6705	51.6103	55.5935	62.5536	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.1217	15.2073	12.3674	9.3629	6.9989	5.9088	6.3846	8.2990	11.1389	14.1434	16.5074	17.5975	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	245.9478	248.5000	242.0686	228.3770	211.0937	194.8499	183.9980	181.4459	187.8772	201.5689	218.8522	235.0960	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	85.0653	82.8454	78.9312	70.7939	65.6453	60.2624	57.1567	60.0744	63.4313	69.3687	77.2132	84.0775	(72)
Total internal gains													
	441.1535	439.5713	426.3860	401.5525	376.7565	347.0398	333.5581	335.8379	348.4661	378.0996	405.5914	429.7896	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)

Solar gains	46.5653	87.7819	142.5887	214.3569	274.4926	287.6368	271.0165	223.8396	167.0771	103.0793	57.3159	38.8528	(83)
Total gains	487.7189	527.3532	568.9746	615.9094	651.2491	634.6766	604.5746	559.6775	515.5432	481.1789	462.9073	468.6425	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.9881	35.2975	35.6062	37.1312	37.4311	38.8937	38.8937	39.1772	38.3170	37.4311	36.8293	36.2204	
alpha	3.3325	3.3532	3.3737	3.4754	3.4954	3.5929	3.5929	3.6118	3.5545	3.4954	3.4553	3.4147	
util living area													
	0.9918	0.9884	0.9803	0.9580	0.9043	0.7909	0.6517	0.7037	0.8856	0.9676	0.9878	0.9929	(86)
MIT	18.7083	18.9009	19.2731	19.8401	20.3461	20.7513	20.9118	20.8827	20.5728	19.9459	19.2835	18.7411	(87)
Th 2	19.3435	19.3552	19.3666	19.4212	19.4316	19.4802	19.4802	19.4893	19.4614	19.4316	19.4107	19.3891	(88)
util rest of house													
	0.9887	0.9841	0.9724	0.9392	0.8554	0.6765	0.4641	0.5240	0.8062	0.9492	0.9824	0.9903	(89)
MIT 2	17.3553	17.5543	17.9303	18.5217	19.0008	19.3694	19.4608	19.4592	19.2319	18.6391	17.9733	17.4187	(90)
Living area fraction									fLA = Living area / (4) =			0.4363	(91)
MIT	17.9457	18.1419	18.5162	19.0970	19.5878	19.9724	20.0939	20.0803	19.8170	19.2093	18.5450	17.9957	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.7957	17.9919	18.3662	18.9470	19.4378	19.8224	19.9439	19.9303	19.6670	19.0593	18.3950	17.8457	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9845	0.9789	0.9655	0.9315	0.8557	0.7067	0.5277	0.5837	0.8197	0.9431	0.9773	0.9866	(94)
Useful gains	480.1833	516.2000	549.3255	573.7471	557.2534	448.5097	319.0164	326.6939	422.5789	453.7939	452.4167	462.3648	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1521.1920	1462.7395	1314.3045	1067.1049	815.2602	529.5432	339.0664	355.3797	572.9825	891.2764	1209.4916	1485.7752	(97)
Space heating kWh													
	774.5105	636.0745	569.1444	355.2176	191.9570	0.0000	0.0000	0.0000	0.0000	325.4870	545.0939	761.4173	(98a)
Space heating requirement - total per year (kWh/year)												4158.9023	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	774.5105	636.0745	569.1444	355.2176	191.9570	0.0000	0.0000	0.0000	0.0000	325.4870	545.0939	761.4173	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4158.9023	
Space heating per m2											(98c) / (4) =	73.2330	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	774.5105	636.0745	569.1444	355.2176	191.9570	0.0000	0.0000	0.0000	0.0000	325.4870	545.0939	761.4173	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	922.0363	757.2316	677.5528	422.8781	228.5203	0.0000	0.0000	0.0000	0.0000	387.4845	648.9213	906.4492	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)

Water heating

Water heating requirement

	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.9609	81.8501	81.5672	80.9314	79.6882	75.0000	75.0000	75.0000	75.0000	80.7219	81.5840	81.9515 (217)
Fuel for water heating, kWh/month												
	247.1637	217.7609	230.7866	202.7396	197.8046	187.2934	184.0634	193.2065	197.1118	206.2604	218.9069	244.4575 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	14.9865	12.0227	10.8251	7.9310	6.1261	5.0051	5.5884	7.2641	9.4353	12.3796	13.9827	15.4030 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year

Space heating fuel - main system 1	4951.0741 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	75.0000
Water heating fuel used	2527.5552 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
central heating pump	115.0000 (230c)
Total electricity for the above, kWh/year	115.0000 (231)
Electricity for lighting (calculated in Appendix L)	120.9497 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	7714.5790 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4951.0741	3.6400	180.2191	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2527.5552	3.6400	92.0030	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	120.9497	16.4900	19.9446	(250)
Additional standing charges			92.0000	(251)
Total energy cost			403.1302	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.4257	(257)
SAP value		76.8886	
SAP rating (Section 12)		77	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4951.0741	0.2100	1039.7256	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2527.5552	0.2100	530.7866	(264)
Space and water heating			1570.5122	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	120.9497	0.1443	17.4568	(268)
Total CO2, kg/year			1603.9209	(272)
CO2 emissions per m2			28.2400	(273)
EI value			78.8854	
EI rating			79	(274)
EI band			C	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.7900	(1b)	x 3.1000	(2b) =	176.0490	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.7900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		176.0490	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1136 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8636 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7341 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8809	0.8625	0.8442	0.7708	0.7524	0.6790	0.6790	0.6790	0.6790	0.7708	0.7891	0.8258	(22b)
Effective ac	0.8880	0.8720	0.8563	0.7970	0.7831	0.7305	0.7305	0.7305	0.7305	0.7970	0.8114	0.8410	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			56.7900	0.2500	14.1975			(28a)
External Wall 1	51.5500	6.7200	44.8300	0.3000	13.4490			(29a)
Total net area of external elements Aum(A, m2)			108.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.5556			(33)
Party Ceiling 1			56.7900					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		21.6680 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	58.2236 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.5878	50.6584	49.7486	46.3050	45.4931	42.4408	42.4408	42.4408	42.4408	46.3050	47.1366	48.8584	(38)
Heat transfer coeff	109.8114	108.8820	107.9722	104.5286	103.7166	100.6644	100.6644	100.6644	100.6644	104.5286	105.3602	107.0819	(39)
Average = Sum(39)m / 12 =												104.5449	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9336	1.9173	1.9013	1.8406	1.8263	1.7726	1.7726	1.7726	1.7726	1.8406	1.8553	1.8856	(40)
HLP (average)												1.8409	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.8896 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
62.7910	61.8474	60.4723	57.8414	55.8999	53.7347	52.5040	53.8686	55.3645	57.6893	60.3767	62.5504	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.9812	32.7455	31.5098	30.2741	29.0385	27.8028	27.8028	29.0385	30.2741	31.5098	32.7455	33.9812	(42c)

Average daily hot water use (litres/day)	88.7832 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.7722	94.5929	91.9821	88.1156	84.9383	81.5375	80.3068	82.9071	85.6387	89.1991	93.1222	96.5316	(44)
Energy conte	153.2635	134.6990	141.3731	120.6258	114.3433	100.2598	97.1241	102.6563	105.6010	121.0423	132.6697	151.1452	(45)
Energy content (annual)										Total = Sum(45)m =		1474.8031	
Distribution loss (46)m = 0.15 x (45)m	22.9895	20.2048	21.2060	18.0939	17.1515	15.0390	14.5686	15.3984	15.8402	18.1564	19.9004	22.6718	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3140	43.5386	46.8731	43.4542	43.2836	40.2103	40.9234	42.2485	42.2328	45.4549	45.9233	49.1914	(61)
Total heat required for water heating calculated for each month	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													

	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366	(64)
									Total per year (kWh/year) = Sum(64)m =			2007.4514	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
	63.2886	55.6721	58.7248	50.9716	48.8401	43.3890	42.5246	44.6954	45.6705	51.6103	55.5935	62.5536	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	113.3748	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.1217	15.2073	12.3674	9.3629	6.9989	5.9088	6.3846	8.2990	11.1389	14.1434	16.5074	17.5975	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	245.9478	248.5000	242.0686	228.3770	211.0937	194.8499	183.9980	181.4459	187.8772	201.5689	218.8522	235.0960	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	48.2271	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	-75.5832	(71)
Water heating gains (Table 5)													
	85.0653	82.8454	78.9312	70.7939	65.6453	60.2624	57.1567	60.0744	63.4313	69.3687	77.2132	84.0775	(72)
Total internal gains													
	441.1535	439.5713	426.3860	401.5525	376.7565	347.0398	333.5581	335.8379	348.4661	378.0996	405.5914	429.7896	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)

Solar gains	42.9834	82.9051	141.1034	217.2150	273.0630	291.9514	266.7147	216.7110	167.0771	101.5175	53.8422	37.0027	(83)
Total gains	484.1369	522.4764	567.4893	618.7675	649.8195	638.9912	600.2727	552.5489	515.5432	479.6171	459.4336	466.7923	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.9139	36.2204	36.5256	37.7289	38.0243	39.1772	39.1772	39.1772	39.1772	37.7289	37.4311	36.8293	
alpha	3.3943	3.4147	3.4350	3.5153	3.5350	3.6118	3.6118	3.6118	3.6118	3.5153	3.4954	3.4553	
util living area													
	0.9914	0.9880	0.9794	0.9549	0.8953	0.7802	0.6725	0.7188	0.8824	0.9668	0.9869	0.9924	(86)
MIT	18.8361	19.0058	19.3592	19.9051	20.4090	20.7700	20.8993	20.8712	20.5937	19.9723	19.3792	18.8479	(87)
Th 2	19.3779	19.3891	19.4000	19.4417	19.4516	19.4893	19.4893	19.4893	19.4893	19.4417	19.4316	19.4107	(88)
util rest of house													
	0.9881	0.9835	0.9711	0.9346	0.8416	0.6624	0.4937	0.5437	0.8027	0.9479	0.9810	0.9896	(89)
MIT 2	17.5057	17.6815	18.0382	18.5988	19.0719	19.3895	19.4644	19.4543	19.2711	18.6719	18.0827	17.5397	(90)
Living area fraction									fLA = Living area / (4) =			0.4363	(91)
MIT	18.0862	18.2593	18.6146	19.1688	19.6553	19.9919	20.0905	20.0726	19.8482	19.2393	18.6484	18.1105	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9362	18.1093	18.4646	19.0188	19.5053	19.8419	19.9405	19.9226	19.6982	19.0893	18.4984	17.9605	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9839	0.9783	0.9643	0.9272	0.8439	0.6944	0.5534	0.6013	0.8166	0.9419	0.9758	0.9859	(94)
Useful gains	476.3395	511.1486	547.2029	573.7414	548.3985	443.6884	332.1873	332.2546	420.9900	451.7379	448.3326	460.1874	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1453.4905	1405.5939	1270.2520	1036.7968	778.4262	517.6061	356.4053	364.6642	563.5394	876.9215	1158.7926	1430.6711	(97)
Space heating kWh													
	727.0003	601.0673	537.9485	333.3999	171.1406	0.0000	0.0000	0.0000	0.0000	316.3366	511.5312	722.0398	(98a)
Space heating requirement - total per year (kWh/year)												3920.4642	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	727.0003	601.0673	537.9485	333.3999	171.1406	0.0000	0.0000	0.0000	0.0000	316.3366	511.5312	722.0398	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3920.4642	
Space heating per m2											(98c) / (4) =	69.0344	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	727.0003	601.0673	537.9485	333.3999	171.1406	0.0000	0.0000	0.0000	0.0000	316.3366	511.5312	722.0398	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	865.4766	715.5563	640.4148	396.9046	203.7388	0.0000	0.0000	0.0000	0.0000	376.5912	608.9657	859.5712	(211)
Space heating efficiency (main heating system 2)													

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating												
Water heating requirement												
	202.5775	178.2376	188.2462	164.0800	157.6270	140.4701	138.0475	144.9048	147.8338	166.4972	178.5929	200.3366 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.8593	81.7562	81.4659	80.8020	79.4301	75.0000	75.0000	75.0000	75.0000	80.6622	81.4700	81.8663 (217)
Fuel for water heating, kWh/month												
	247.4704	218.0113	231.0738	203.0644	198.4474	187.2934	184.0634	193.2065	197.1118	206.4130	219.2131	244.7120 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	14.9865	12.0227	10.8251	7.9310	6.1261	5.0051	5.5884	7.2641	9.4353	12.3796	13.9827	15.4030 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4667.2193	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2530.0803	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	120.9497	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7433.2493	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4667.2193	5.6000	261.3643	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2530.0803	5.6000	141.6845	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	120.9497	26.0600	31.5195	(250)
Additional standing charges			99.0000	(251)
Total energy cost			563.5373	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4667.2193	0.2100	980.1160	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2530.0803	0.2100	531.3169	(264)
Space and water heating			1511.4329	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	120.9497	0.1443	17.4568	(268)
Total CO2, kg/year			1544.8416	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4667.2193	1.1300	5273.9578	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2530.0803	1.1300	2858.9908	(278)
Space and water heating			8132.9486	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	120.9497	1.5338	185.5166	(282)
Total Primary energy kWh/year			8492.4372	(286)

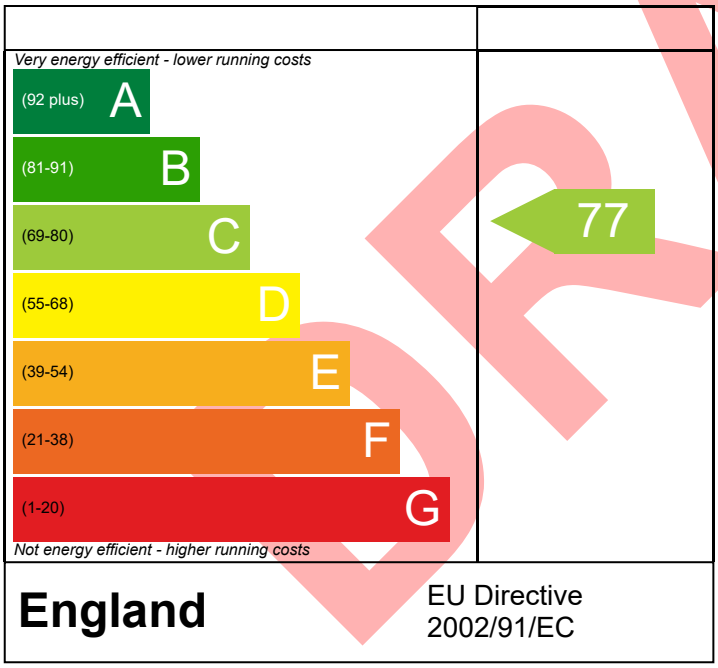
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	56.79 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

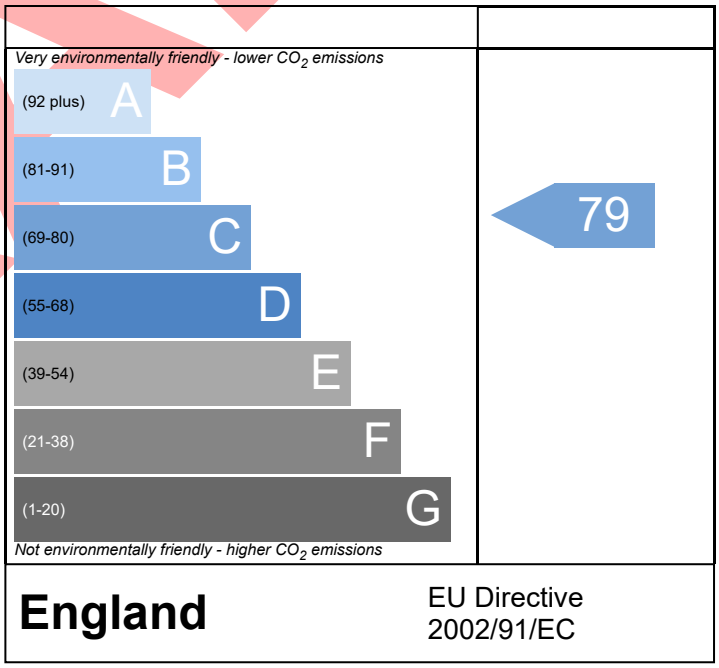
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

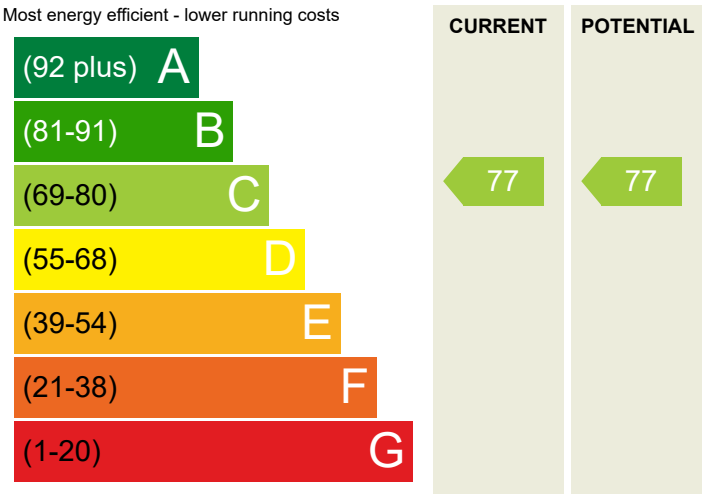
Energy Report

Dwelling Address	
Reference	Apt. 2-Apt. 2
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	57

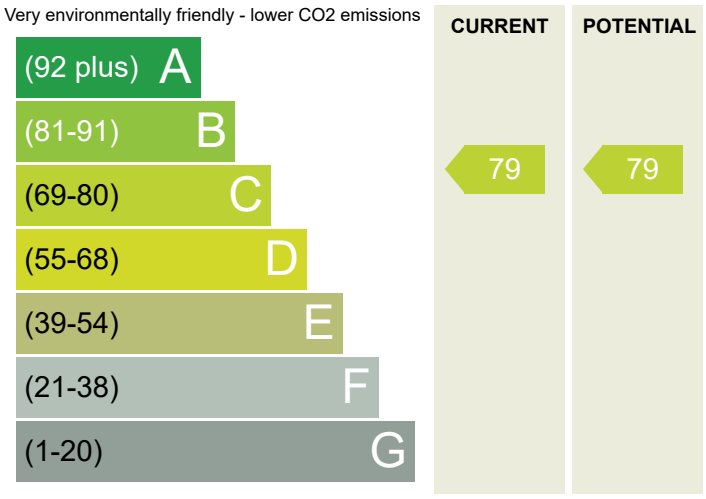
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

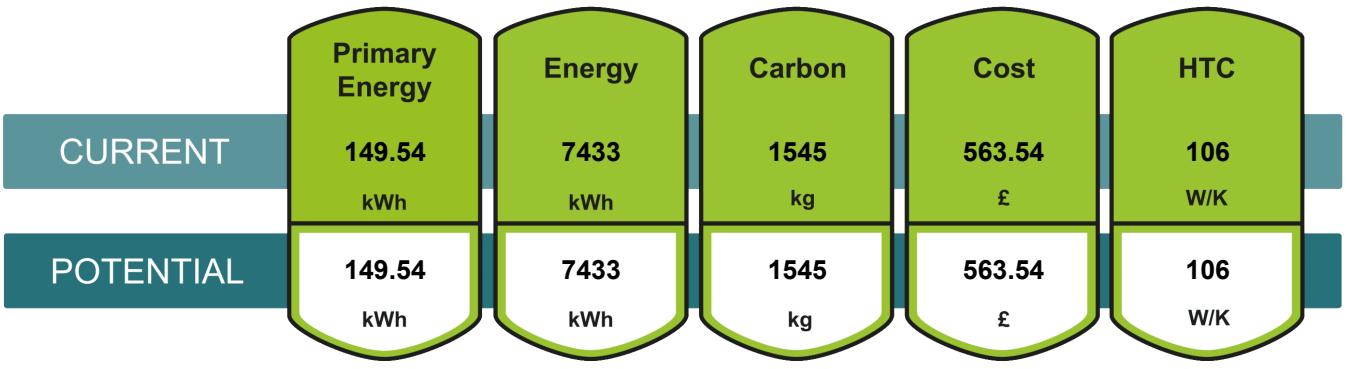
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£32	£32	You could save £0
Heating	£390	£390	
Hot Water	£142	£142	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£564	£564	

Estimated energy use and potential savings

Space Heating
4667
kWh per year

Water Heating
2530
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 2	Issued on Date	01/10/2024
Assessment Reference	Apt. 2	Prop Type Ref	Detached Flat
Property			

SAP Rating	77 C	DER	28.83	TER	
Environmental	79 C	% DER < TER			N/A
CO_2 Emissions (t/year)	1.54	DFEE	81.28	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	158.27	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	51.55	m²	

Comments

Heat Loss Floors

Dwelling Sign Off Report

Description	Heatloss Floor 1		
Type	Ground Floor - Timber		
Construction	Other		
U-value	0.25	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	56.79	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SE1	New Glazing	External Wall 1	South East	1.36
W NE1 - Upgrade	New Glazing	External Wall 1	North East	5.36

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1

SAP table

Fuel Type	Mains gas	
Winter Efficiency	84.00	%
Summer Efficiency	75.00	%
Model Name		
Manufacturer		
System Type		
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Flow Temperature Value		

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2 None

Secondary Heating None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Dwelling Sign Off Report

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 3	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 3	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	27.37	**TER**	
Environmental	81 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.38	**DFEE**	74.40	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	150.52	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.23 m	53.41 m²	3.10 m

8.0 Living Area	24.14	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	44.93	38.21	0.00	None	6.72	Enter Gross Area

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	53.41

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Other	0.25	None	0.00	0.00	53.41

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SW1	New Glazing	External Wall 1	South West	5.36	0
W SE1	New Glazing	External Wall 1	South East	1.36	0

Summary for Input Data

elmhurst energy

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type

Heat source 1	None
Heat source 2	None
Heat source 3	None
Heat source 4	None
Heat source 5	None

27.0 Secondary Heating	None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 3	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 3	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	27.37	**TER**	
Environmental	81 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.38	**DFEE**	74.40	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	150.52	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		53.4100 (1b)	x	3.1000 (2b)	=	165.5710	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	165.5710	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8708	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9437	0.9252	0.9067	0.8142	0.7957	0.7032	0.7032	0.6847	0.7402	0.7957	0.8327	0.8697	(22b)
Effective ac	0.9453	0.9280	0.9111	0.8315	0.8166	0.7472	0.7472	0.7344	0.7739	0.8166	0.8467	0.8782	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Total net area of external elements Aum(A, m2)			98.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		33.7246			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.6680	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 53.3926	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.6501	50.7053	49.7792	45.4294	44.6155	40.8270	40.8270	40.1254	42.2863	44.6155	46.2619	47.9831	(38)
Heat transfer coeff	105.0427	104.0979	103.1718	98.8220	98.0081	94.2196	94.2196	93.5180	95.6789	98.0081	99.6545	101.3757	(39)
Average = Sum(39)m / 12 =												98.8181	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.9667	1.9490	1.9317	1.8503	1.8350	1.7641	1.7641	1.7509	1.7914	1.8350	1.8658	1.8981	(40)
HLP (average)												1.8502	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7906	(42)
Hot water usage for mixer showers													
	60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												86.1372	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m													
	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.8443	42.2410	45.4761	42.1592	41.9937	39.0119	39.7038	40.9894	40.9741	44.1002	44.5546	47.7254	(61)
Total heat required for water heating calculated for each month													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(64)
										Total per year (kWh/year) = Sum(64)m =		1947.6228	(64)
12Total per year (kWh/year)												1948	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	61.4024	54.0129	56.9747	49.4525	47.3845	42.0958	41.2572	43.3633	44.3094	50.0721	53.9366	60.6893	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	83.9693	92.9660	83.9693	86.7683	83.9693	86.7683	83.9693	83.9693	86.7683	83.9693	86.7683	83.9693	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	156.0792	157.6988	153.6174	144.9286	133.9606	123.6523	116.7656	115.1460	119.2274	127.9162	138.8842	149.1925	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	82.5301	80.3763	76.5788	68.6841	63.6888	58.4664	55.4533	58.2840	61.5408	67.3013	74.9120	81.5717	(72)
Total internal gains													
	379.4382	387.9007	371.0252	357.2406	338.4784	318.7466	306.0478	307.2589	317.3961	336.0463	357.4240	371.5931	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	5.3600	36.7938	0.7600	0.8000	0.7700	83.0953	(79)

Solar gains	104.1792	177.4558	242.8027	300.8443	336.9707	334.5339	322.5264	295.5745	262.9040	196.1264	124.7827	89.1557	(83)
Total gains	483.6174	565.3565	613.8279	658.0849	675.4491	653.2805	628.5742	602.8334	580.3001	532.1728	482.2067	460.7488	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.3097	35.6302	35.9500	37.5324	37.8441	39.3658	39.3658	39.6611	38.7654	37.8441	37.2189	36.5869	
alpha	3.3540	3.3753	3.3967	3.5022	3.5229	3.6244	3.6244	3.6441	3.5844	3.5229	3.4813	3.4391	
util living area													
	0.9903	0.9829	0.9708	0.9404	0.8786	0.7513	0.6014	0.6381	0.8293	0.9489	0.9833	0.9918	(86)
MIT	18.7719	19.0372	19.4186	19.9732	20.4325	20.7975	20.9340	20.9176	20.6784	20.0822	19.3824	18.7989	(87)
Th 2	19.3556	19.3675	19.3793	19.4350	19.4456	19.4953	19.4953	19.5045	19.4760	19.4456	19.4243	19.4022	(88)
util rest of house													
	0.9869	0.9768	0.9596	0.9155	0.8220	0.6326	0.4218	0.4636	0.7325	0.9222	0.9762	0.9889	(89)
MIT 2	17.4264	17.6964	18.0796	18.6543	19.0817	19.4086	19.4814	19.4849	19.3155	18.7744	18.0794	17.4848	(90)
Living area fraction										fLA = Living area / (4) =		0.4520	(91)
MIT	18.0345	18.3024	18.6848	19.2504	19.6922	20.0364	20.1380	20.1325	19.9315	19.3655	18.6683	18.0787	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.8845	18.1524	18.5348	19.1004	19.5422	19.8864	19.9880	19.9825	19.7815	19.2155	18.5183	17.9287	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9823	0.9703	0.9516	0.9086	0.8263	0.6676	0.4854	0.5247	0.7556	0.9170	0.9704	0.9850	(94)
Useful gains	475.0545	548.5875	584.1293	597.9519	558.1009	436.1367	305.1204	316.3012	438.4992	488.0040	467.9128	453.8153	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1426.9550	1379.5488	1241.6522	1008.0205	768.6039	498.0792	319.2120	335.0240	543.6002	844.3896	1137.8869	1391.7581	(97)
Space heating kWh													
	708.2139	558.4060	489.1970	295.2494	156.6142	0.0000	0.0000	0.0000	0.0000	265.1509	482.3813	697.8294	(98a)
Space heating requirement - total per year (kWh/year)												3653.0421	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	708.2139	558.4060	489.1970	295.2494	156.6142	0.0000	0.0000	0.0000	0.0000	265.1509	482.3813	697.8294	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3653.0421	
Space heating per m2											(98c) / (4) =	68.3962	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	708.2139	558.4060	489.1970	295.2494	156.6142	0.0000	0.0000	0.0000	0.0000	265.1509	482.3813	697.8294	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	843.1118	664.7691	582.3774	351.4873	186.4455	0.0000	0.0000	0.0000	0.0000	315.6558	574.2635	830.7493	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8659	81.6823	81.3463	80.6114	79.2987	75.0000	75.0000	75.0000	75.0000	80.3497	81.4180	81.8600	(217)
Fuel for water heating, kWh/month													
	240.0754	211.7050	224.5164	197.4781	192.8520	181.7115	178.5777	187.4483	191.2372	201.0399	212.8156	237.4370	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.1365	11.3408	10.2111	7.4811	5.7786	4.7212	5.2715	6.8520	8.9001	11.6774	13.1896	14.5293	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4348.8597	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												75.0000	
Water heating fuel used												2456.8942	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												115.0000	(230c)
Total electricity for the above, kWh/year												115.0000	(231)
Electricity for lighting (calculated in Appendix L)												114.0893	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												7034.8431	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4348.8597	0.2100	913.2605	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2456.8942	0.2100	515.9478	(264)
Space and water heating			1429.2083	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.0893	0.1443	16.4666	(268)
Total CO2, kg/year			1461.6268	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			27.3700	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4348.8597	1.1300	4914.2114	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2456.8942	1.1300	2776.2905	(278)
Space and water heating			7690.5019	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	114.0893	1.5338	174.9939	(282)
Total Primary energy kWh/year			8039.4678	(286)
Dwelling Primary energy Rate (DPER)			150.5200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 3	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 3	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	27.37	**TER**	
Environmental	81 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.38	**DFEE**	74.40	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	150.52	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	53.4100	(1b)	x 3.1000	(2b) =	165.5710	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		165.5710	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8708	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9437	0.9252	0.9067	0.8142	0.7957	0.7032	0.7032	0.6847	0.7402	0.7957	0.8327	0.8697	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9453	0.9280	0.9111	0.8315	0.8166	0.7472	0.7472	0.7344	0.7739	0.8166	0.8467	0.8782	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Total net area of external elements Aum(A, m2)			98.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		33.7246			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.6680	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	53.3926	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.6501	50.7053	49.7792	45.4294	44.6155	40.8270	40.8270	40.1254	42.2863	44.6155	46.2619	47.9831	(38)
Heat transfer coeff	105.0427	104.0979	103.1718	98.8220	98.0081	94.2196	94.2196	93.5180	95.6789	98.0081	99.6545	101.3757	(39)
Average = Sum(39)m / 12 =												98.8181	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9667	1.9490	1.9317	1.8503	1.8350	1.7641	1.7641	1.7509	1.7914	1.8350	1.8658	1.8981	(40)
HLP (average)												1.8502	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7906	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	23.4494	23.1011	22.6107	21.7064	21.0294	20.2786	19.8730	20.3600	20.8903	21.6936	22.6165	23.3701	(42b)
Hot water usage for other uses													
	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												51.7121	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	56.4173	54.8702	53.1810	51.0779	49.2020	47.2523	46.8468	48.5326	50.2617	52.2639	54.3856	56.3380	(44)
Energy conte	89.3512	78.1344	81.7372	69.9231	66.2353	58.1023	56.6572	60.0935	61.9777	70.9216	77.4823	88.2117	(45)
Energy content (annual)										Total = Sum(45)m =		858.8275	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	75.9485	66.4143	69.4766	59.4346	56.3000	49.3869	48.1586	51.0795	52.6811	60.2834	65.8599	74.9800	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	75.9485	66.4143	69.4766	59.4346	56.3000	49.3869	48.1586	51.0795	52.6811	60.2834	65.8599	74.9800	(64)
										Total per year (kWh/year) = Sum(64)m =		730.0034	(64)
12Total per year (kWh/year)												730	(64)
Electric shower(s)													
	43.4393	38.7048	42.2642	40.3322	41.0890	39.1949	40.5014	41.0890	40.3322	42.2642	41.4694	43.4393	(64a)
							Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					494.1199	(64a)
Heat gains from water heating, kWh/month													
	29.8470	26.2798	27.9352	24.9417	24.3472	22.1455	22.1650	23.0421	23.2533	25.6369	26.8323	29.6048	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	83.9693	92.9660	83.9693	86.7683	83.9693	86.7683	83.9693	83.9693	86.7683	83.9693	86.7683	83.9693	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	156.0792	157.6988	153.6174	144.9286	133.9606	123.6523	116.7656	115.1460	119.2274	127.9162	138.8842	149.1925	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	40.1169	39.1068	37.5473	34.6412	32.7248	30.7576	29.7917	30.9706	32.2963	34.4582	37.2671	39.7914	(72)
Total internal gains													
	330.0250	339.6312	324.9936	316.1978	300.5144	291.0377	280.3862	279.9455	288.1516	296.2033	312.7792	322.8129	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	5.3600	36.7938	0.7600	0.8000	0.7700	83.0953	(79)

Solar gains	104.1792	177.4558	242.8027	300.8443	336.9707	334.5339	322.5264	295.5745	262.9040	196.1264	124.7827	89.1557	(83)
Total gains	434.2042	517.0870	567.7963	617.0421	637.4851	625.5717	602.9126	575.5200	551.0555	492.3297	437.5619	411.9686	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.3097	35.6302	35.9500	37.5324	37.8441	39.3658	39.3658	39.6611	38.7654	37.8441	37.2189	36.5869	
alpha	3.3540	3.3753	3.3967	3.5022	3.5229	3.6244	3.6244	3.6441	3.5844	3.5229	3.4813	3.4391	
util living area													
	0.9930	0.9869	0.9766	0.9497	0.8936	0.7691	0.6205	0.6593	0.8464	0.9586	0.9875	0.9942	(86)
MIT	18.6884	18.9576	19.3459	19.9147	20.3900	20.7800	20.9269	20.9082	20.6518	20.0234	19.3077	18.7151	(87)
Th 2	19.3556	19.3675	19.3793	19.4350	19.4456	19.4953	19.4953	19.5045	19.4760	19.4456	19.4243	19.4022	(88)
util rest of house													
	0.9905	0.9820	0.9673	0.9280	0.8414	0.6524	0.4381	0.4829	0.7542	0.9362	0.9821	0.9921	(89)
MIT 2	17.3439	17.6185	18.0097	18.6011	19.0481	19.3993	19.4796	19.4821	19.2985	18.7211	18.0066	17.4019	(90)
Living area fraction									fLA = Living area / (4) =			0.4520	(91)
MIT	17.9516	18.2238	18.6136	19.1948	19.6546	20.0234	20.1338	20.1267	19.9102	19.3097	18.5947	17.9955	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.9516	18.2238	18.6136	19.1948	19.6546	20.0234	20.1338	20.1267	19.9102	19.3097	18.5947	17.9955	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9872	0.9773	0.9614	0.9237	0.8499	0.6986	0.5215	0.5630	0.7853	0.9336	0.9780	0.9894	(94)
Useful gains	428.6678	505.3262	545.8663	569.9407	541.7844	437.0040	314.4318	324.0287	432.7342	459.6364	427.9482	407.6062	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1434.0008	1386.9774	1249.7828	1017.3520	779.6177	510.9888	332.9501	348.5100	555.9095	853.6189	1145.4974	1398.5244	(97)
Space heating kWh													
	747.9677	592.4696	523.7139	322.1361	176.9480	0.0000	0.0000	0.0000	0.0000	293.1230	516.6354	737.2431	(98a)
Space heating requirement - total per year (kWh/year)												3910.2368	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	747.9677	592.4696	523.7139	322.1361	176.9480	0.0000	0.0000	0.0000	0.0000	293.1230	516.6354	737.2431	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3910.2368	
Space heating per m2											(98c) / (4) =	73.2117	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	885.6642	697.2250	710.7369	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6819	0.7693	0.7431	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	603.9658	536.3670	528.1444	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	697.0212	672.3336	641.9733	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	66.9999	101.1592	84.6887	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	16.7500	25.2898	21.1722	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												63.2119	(107)
Energy for space heating												73.2117	(99)
Energy for space cooling												1.1835	(108)
Total												74.3952	(109)
Fabric Energy Efficiency (DFEE)												74.4	(109)

Full SAP Calculation Printout

Property Reference	Apt. 3	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 3	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	27.37	**TER**	
Environmental	81 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.38	**DFEE**	74.40	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	150.52	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		53.4100 (1b)	x	3.1000 (2b)	=	165.5710	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	165.5710	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8708	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9437	0.9252	0.9067	0.8142	0.7957	0.7032	0.7032	0.6847	0.7402	0.7957	0.8327	0.8697	(22b)
Effective ac	0.9453	0.9280	0.9111	0.8315	0.8166	0.7472	0.7472	0.7344	0.7739	0.8166	0.8467	0.8782	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Total net area of external elements Aum(A, m2)			98.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		33.7246			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.6680	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 53.3926	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.6501	50.7053	49.7792	45.4294	44.6155	40.8270	40.8270	40.1254	42.2863	44.6155	46.2619	47.9831	(38)
Heat transfer coeff	105.0427	104.0979	103.1718	98.8220	98.0081	94.2196	94.2196	93.5180	95.6789	98.0081	99.6545	101.3757	(39)
Average = Sum(39)m / 12 =												98.8181	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.9667	1.9490	1.9317	1.8503	1.8350	1.7641	1.7641	1.7509	1.7914	1.8350	1.8658	1.8981	(40)
HLP (average)												1.8502	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7906	(42)
Hot water usage for mixer showers													
	60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												86.1372	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m													
	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.8443	42.2410	45.4761	42.1592	41.9937	39.0119	39.7038	40.9894	40.9741	44.1002	44.5546	47.7254	(61)
Total heat required for water heating calculated for each month													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(64)
										Total per year (kWh/year) = Sum(64)m =		1947.6228	(64)
12Total per year (kWh/year)												1948	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	61.4024	54.0129	56.9747	49.4525	47.3845	42.0958	41.2572	43.3633	44.3094	50.0721	53.9366	60.6893	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	89.5320	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	83.9693	92.9660	83.9693	86.7683	83.9693	86.7683	83.9693	83.9693	86.7683	83.9693	86.7683	83.9693	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	156.0792	157.6988	153.6174	144.9286	133.9606	123.6523	116.7656	115.1460	119.2274	127.9162	138.8842	149.1925	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	31.9532	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	82.5301	80.3763	76.5788	68.6841	63.6888	58.4664	55.4533	58.2840	61.5408	67.3013	74.9120	81.5717	(72)
Total internal gains													
	379.4382	387.9007	371.0252	357.2406	338.4784	318.7466	306.0478	307.2589	317.3961	336.0463	357.4240	371.5931	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	5.3600	36.7938	0.7600	0.8000	0.7700	83.0953	(79)

Solar gains	104.1792	177.4558	242.8027	300.8443	336.9707	334.5339	322.5264	295.5745	262.9040	196.1264	124.7827	89.1557	(83)
Total gains	483.6174	565.3565	613.8279	658.0849	675.4491	653.2805	628.5742	602.8334	580.3001	532.1728	482.2067	460.7488	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.3097	35.6302	35.9500	37.5324	37.8441	39.3658	39.3658	39.6611	38.7654	37.8441	37.2189	36.5869	
alpha	3.3540	3.3753	3.3967	3.5022	3.5229	3.6244	3.6244	3.6441	3.5844	3.5229	3.4813	3.4391	
util living area													
	0.9903	0.9829	0.9708	0.9404	0.8786	0.7513	0.6014	0.6381	0.8293	0.9489	0.9833	0.9918	(86)
MIT	18.7719	19.0372	19.4186	19.9732	20.4325	20.7975	20.9340	20.9176	20.6784	20.0822	19.3824	18.7989	(87)
Th 2	19.3556	19.3675	19.3793	19.4350	19.4456	19.4953	19.4953	19.5045	19.4760	19.4456	19.4243	19.4022	(88)
util rest of house													
	0.9869	0.9768	0.9596	0.9155	0.8220	0.6326	0.4218	0.4636	0.7325	0.9222	0.9762	0.9889	(89)
MIT 2	17.4264	17.6964	18.0796	18.6543	19.0817	19.4086	19.4814	19.4849	19.3155	18.7744	18.0794	17.4848	(90)
Living area fraction										fLA = Living area / (4) =		0.4520	(91)
MIT	18.0345	18.3024	18.6848	19.2504	19.6922	20.0364	20.1380	20.1325	19.9315	19.3655	18.6683	18.0787	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.8845	18.1524	18.5348	19.1004	19.5422	19.8864	19.9880	19.9825	19.7815	19.2155	18.5183	17.9287	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9823	0.9703	0.9516	0.9086	0.8263	0.6676	0.4854	0.5247	0.7556	0.9170	0.9704	0.9850	(94)
Useful gains	475.0545	548.5875	584.1293	597.9519	558.1009	436.1367	305.1204	316.3012	438.4992	488.0040	467.9128	453.8153	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1426.9550	1379.5488	1241.6522	1008.0205	768.6039	498.0792	319.2120	335.0240	543.6002	844.3896	1137.8869	1391.7581	(97)
Space heating kWh													
	708.2139	558.4060	489.1970	295.2494	156.6142	0.0000	0.0000	0.0000	0.0000	265.1509	482.3813	697.8294	(98a)
Space heating requirement - total per year (kWh/year)												3653.0421	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	708.2139	558.4060	489.1970	295.2494	156.6142	0.0000	0.0000	0.0000	0.0000	265.1509	482.3813	697.8294	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3653.0421	
Space heating per m2											(98c) / (4) =	68.3962	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	708.2139	558.4060	489.1970	295.2494	156.6142	0.0000	0.0000	0.0000	0.0000	265.1509	482.3813	697.8294	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	843.1118	664.7691	582.3774	351.4873	186.4455	0.0000	0.0000	0.0000	0.0000	315.6558	574.2635	830.7493	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8659	81.6823	81.3463	80.6114	79.2987	75.0000	75.0000	75.0000	75.0000	80.3497	81.4180	81.8600	(217)
Fuel for water heating, kWh/month													
	240.0754	211.7050	224.5164	197.4781	192.8520	181.7115	178.5777	187.4483	191.2372	201.0399	212.8156	237.4370	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.1365	11.3408	10.2111	7.4811	5.7786	4.7212	5.2715	6.8520	8.9001	11.6774	13.1896	14.5293	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4348.8597	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												75.0000	
Water heating fuel used												2456.8942	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												115.0000	(230c)
Total electricity for the above, kWh/year												115.0000	(231)
Electricity for lighting (calculated in Appendix L)												114.0893	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												7034.8431	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4348.8597	0.2100	913.2605	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2456.8942	0.2100	515.9478	(264)
Space and water heating			1429.2083	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.0893	0.1443	16.4666	(268)
Total CO2, kg/year			1461.6268	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			27.3700	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4348.8597	1.1300	4914.2114	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2456.8942	1.1300	2776.2905	(278)
Space and water heating			7690.5019	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	114.0893	1.5338	174.9939	(282)
Total Primary energy kWh/year			8039.4678	(286)
Dwelling Primary energy Rate (DPER)			150.5200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 3	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 3	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	27.37	**TER**	
Environmental	81 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.38	**DFEE**	74.40	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	150.52	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		53.4100 (1b)	x	3.1000 (2b)	=	165.5710	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	165.5710	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8708 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9437	0.9252	0.9067	0.8142	0.7957	0.7032	0.7032	0.6847	0.7402	0.7957	0.8327	0.8697	(22b)
Effective ac	0.9453	0.9280	0.9111	0.8315	0.8166	0.7472	0.7472	0.7344	0.7739	0.8166	0.8467	0.8782	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Total net area of external elements Aum(A, m2)			98.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		33.7246			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.6680	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 53.3926	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.6501	50.7053	49.7792	45.4294	44.6155	40.8270	40.8270	40.1254	42.2863	44.6155	46.2619	47.9831	(38)
Heat transfer coeff	105.0427	104.0979	103.1718	98.8220	98.0081	94.2196	94.2196	93.5180	95.6789	98.0081	99.6545	101.3757	(39)
Average = Sum(39)m / 12 =												98.8181	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.9667	1.9490	1.9317	1.8503	1.8350	1.7641	1.7641	1.7509	1.7914	1.8350	1.8658	1.8981	(40)
HLP (average)												1.8502	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7906	(42)
Hot water usage for mixer showers													
	60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												86.1372	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m													
	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.8443	42.2410	45.4761	42.1592	41.9937	39.0119	39.7038	40.9894	40.9741	44.1002	44.5546	47.7254	(61)
Total heat required for water heating calculated for each month													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(64)
										Total per year (kWh/year) = Sum(64)m =		1947.6228	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	61.4024	54.0129	56.9747	49.4525	47.3845	42.0958	41.2572	43.3633	44.3094	50.0721	53.9366	60.6893	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.1505	14.3447	11.6659	8.8319	6.6019	5.5736	6.0225	7.8283	10.5071	13.3411	15.5711	16.5994	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	232.9540	235.3713	229.2797	216.3114	199.9412	184.5556	174.2771	171.8597	177.9513	190.9196	207.2898	222.6754	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	82.5301	80.3763	76.5788	68.6841	63.6888	58.4664	55.4533	58.2840	61.5408	67.3013	74.9120	81.5717	(72)
Total internal gains													
	421.9819	420.4396	407.8717	384.1746	360.5793	331.9430	319.1001	321.3193	333.3465	361.9093	388.1201	411.1938	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	5.3600	36.7938	0.7600	0.8000	0.7700	83.0953	(79)

Solar gains	104.1792	177.4558	242.8027	300.8443	336.9707	334.5339	322.5264	295.5745	262.9040	196.1264	124.7827	89.1557	(83)
Total gains	526.1611	597.8954	650.6745	685.0189	697.5500	666.4769	641.6265	616.8938	596.2505	558.0358	512.9028	500.3495	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.3097	35.6302	35.9500	37.5324	37.8441	39.3658	39.3658	39.6611	38.7654	37.8441	37.2189	36.5869	
alpha	3.3540	3.3753	3.3967	3.5022	3.5229	3.6244	3.6244	3.6441	3.5844	3.5229	3.4813	3.4391	
util living area													
	0.9876	0.9799	0.9657	0.9339	0.8697	0.7429	0.5920	0.6275	0.8198	0.9420	0.9799	0.9895	(86)
MIT	18.8430	19.0901	19.4756	20.0103	20.4560	20.8053	20.9373	20.9221	20.6920	20.1192	19.4329	18.8662	(87)
Th 2	19.3556	19.3675	19.3793	19.4350	19.4456	19.4953	19.4953	19.5045	19.4760	19.4456	19.4243	19.4022	(88)
util rest of house													
	0.9832	0.9728	0.9528	0.9069	0.8106	0.6234	0.4139	0.4542	0.7209	0.9126	0.9716	0.9858	(89)
MIT 2	17.4964	17.7480	18.1340	18.6877	19.1000	19.4127	19.4822	19.4861	19.3241	18.8074	18.1284	17.5512	(90)
Living area fraction										fLA = Living area / (4) =		0.4520	(91)
MIT	18.1050	18.3546	18.7404	19.2855	19.7129	20.0421	20.1399	20.1351	19.9424	19.4003	18.7180	18.1455	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9550	18.2046	18.5904	19.1355	19.5629	19.8921	19.9899	19.9851	19.7924	19.2503	18.5680	17.9955	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9778	0.9658	0.9444	0.9003	0.8160	0.6590	0.4770	0.5149	0.7452	0.9078	0.9652	0.9811	(94)
Useful gains	514.4823	577.4327	614.4767	616.7393	569.1840	439.2228	306.0657	317.6462	444.3165	506.5666	495.0300	490.8806	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1434.3591	1384.9783	1247.3841	1011.4901	770.6261	498.6205	319.3945	335.2758	544.6383	847.7972	1142.8386	1398.5319	(97)
Space heating kWh	684.3884	542.6706	470.8831	284.2206	149.8729	0.0000	0.0000	0.0000	0.0000	253.8755	466.4222	675.2925	(98a)
Space heating requirement - total per year (kWh/year)												3527.6260	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	684.3884	542.6706	470.8831	284.2206	149.8729	0.0000	0.0000	0.0000	0.0000	253.8755	466.4222	675.2925	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3527.6260	
Space heating per m2											(98c) / (4) =	66.0480	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	684.3884	542.6706	470.8831	284.2206	149.8729	0.0000	0.0000	0.0000	0.0000	253.8755	466.4222	675.2925	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	814.7481	646.0365	560.5751	338.3579	178.4202	0.0000	0.0000	0.0000	0.0000	302.2328	555.2645	803.9197	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8097	81.6328	81.2744	80.5306	79.2000	75.0000	75.0000	75.0000	75.0000	80.2551	81.3556	81.8060	(217)
Fuel for water heating, kWh/month	240.2404	211.8335	224.7152	197.6763	193.0923	181.7115	178.5777	187.4483	191.2372	201.2771	212.9788	237.5937	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.1365	11.3408	10.2111	7.4811	5.7786	4.7212	5.2715	6.8520	8.9001	11.6774	13.1896	14.5293	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4199.5548	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2458.3819	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	114.0893	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6887.0259	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4199.5548	3.6400	152.8638	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2458.3819	3.6400	89.4851	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	114.0893	16.4900	18.8133	(250)
Additional standing charges			92.0000	(251)
Total energy cost			372.1257	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.3613	(257)
SAP value		77.9334	
SAP rating (Section 12)		78	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4199.5548	0.2100	881.9065	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2458.3819	0.2100	516.2602	(264)
Space and water heating			1398.1667	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.0893	0.1443	16.4666	(268)
Total CO2, kg/year			1430.5852	(272)
CO2 emissions per m2			26.7800	(273)
EI value			80.5204	
EI rating			81	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	53.4100	(1b)	x 3.1000	(2b) =	165.5710	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	165.5710	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8708	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8882	0.8697	0.8512	0.7772	0.7587	0.6847	0.6847	0.6847	0.6847	0.7772	0.7957	0.8327	(22b)
Effective ac	0.8945	0.8782	0.8623	0.8020	0.7878	0.7344	0.7344	0.7344	0.7344	0.8020	0.8166	0.8467	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Total net area of external elements Aum(A, m2)			98.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		33.7246			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.6680	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	53.3926	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	48.8718	47.9831	47.1132	43.8204	43.0440	40.1254	40.1254	40.1254	40.1254	43.8204	44.6155	46.2619	(38)
Heat transfer coeff													
	102.2644	101.3757	100.5058	97.2130	96.4366	93.5180	93.5180	93.5180	93.5180	97.2130	98.0081	99.6545	(39)
Average = Sum(39)m / 12 =												97.2286	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9147	1.8981	1.8818	1.8201	1.8056	1.7509	1.7509	1.7509	1.7509	1.8201	1.8350	1.8658	(40)
HLP (average)												1.8204	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7906	(42)
Hot water usage for mixer showers													
	60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)
Average daily hot water use (litres/day)												86.1372	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m													
	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.8443	42.2410	45.4761	42.1592	41.9937	39.0119	39.7038	40.9894	40.9741	44.1002	44.5546	47.7254	(61)
Total heat required for water heating calculated for each month													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(64)
										Total per year (kWh/year) = Sum(64)m =		1947.6228	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	61.4024	54.0129	56.9747	49.4525	47.3845	42.0958	41.2572	43.3633	44.3094	50.0721	53.9366	60.6893	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.1505	14.3447	11.6659	8.8319	6.6019	5.5736	6.0225	7.8283	10.5071	13.3411	15.5711	16.5994	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	232.9540	235.3713	229.2797	216.3114	199.9412	184.5556	174.2771	171.8597	177.9513	190.9196	207.2898	222.6754	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	82.5301	80.3763	76.5788	68.6841	63.6888	58.4664	55.4533	58.2840	61.5408	67.3013	74.9120	81.5717	(72)
Total internal gains													
	421.9819	420.4396	407.8717	384.1746	360.5793	331.9430	319.1001	321.3193	333.3465	361.9093	388.1201	411.1938	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)
Southwest	5.3600	33.9635	0.7600	0.8000	0.7700	76.7034	(79)

Solar gains	96.1654	167.5971	240.2735	304.8556	335.2157	339.5519	317.4069	286.1613	262.9040	193.1548	117.2201	84.9102	(83)
Total gains	518.1473	588.0367	648.1453	689.0302	695.7949	671.4949	636.5071	607.4806	596.2505	555.0641	505.3402	496.1040	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	36.2690	36.5869	36.9036	38.1536	38.4608	39.6611	39.6611	39.6611	39.6611	38.1536	37.8441	37.2189	
alpha	3.4179	3.4391	3.4602	3.5436	3.5641	3.6441	3.6441	3.6441	3.6441	3.5436	3.5229	3.4813	
util living area													
	0.9872	0.9796	0.9641	0.9288	0.8580	0.7307	0.6131	0.6444	0.8145	0.9409	0.9789	0.9890	(86)
MIT	18.9646	19.1882	19.5613	20.0754	20.5143	20.8218	20.9278	20.9131	20.7113	20.1431	19.5217	18.9693	(87)
Th 2	19.3908	19.4022	19.4133	19.4559	19.4661	19.5045	19.5045	19.5045	19.5045	19.4559	19.4456	19.4243	(88)
util rest of house													
	0.9826	0.9723	0.9505	0.8998	0.7941	0.6085	0.4416	0.4735	0.7157	0.9107	0.9699	0.9850	(89)
MIT 2	17.6411	17.8689	18.2415	18.7641	19.1658	19.4310	19.4877	19.4828	19.3622	18.8376	18.2310	17.6689	(90)

Living area fraction										fLA = Living area / (4) =		0.4520	(91)
MIT	18.2393	18.4652	18.8380	19.3568	19.7752	20.0596	20.1386	20.1292	19.9719	19.4277	18.8144	18.2566	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.0893	18.3152	18.6880	19.2068	19.6252	19.9096	19.9886	19.9792	19.8219	19.2777	18.6644	18.1066	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9772	0.9654	0.9423	0.8939	0.8020	0.6457	0.5018	0.5331	0.7404	0.9062	0.9635	0.9802	(94)
Useful gains	506.3587	567.6618	610.7441	615.9113	557.9980	433.5714	319.3712	323.8332	441.4404	502.9960	486.8943	486.2898	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1369.2460	1329.5630	1204.8632	982.5127	735.3527	487.1891	335.5997	344.0753	535.1050	833.8609	1094.2017	1345.9976	(97)
Space heating kWh													
	641.9881	511.9976	442.0246	263.9530	131.9519	0.0000	0.0000	0.0000	0.0000	246.1635	437.2614	639.6226	(98a)
Space heating requirement - total per year (kWh/year)												3314.9626	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	641.9881	511.9976	442.0246	263.9530	131.9519	0.0000	0.0000	0.0000	0.0000	246.1635	437.2614	639.6226	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3314.9626	
Space heating per m2											(98c) / (4) =	62.0663	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	641.9881	511.9976	442.0246	263.9530	131.9519	0.0000	0.0000	0.0000	0.0000	246.1635	437.2614	639.6226	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	764.2715	609.5209	526.2197	314.2298	157.0856	0.0000	0.0000	0.0000	0.0000	293.0517	520.5492	761.4555	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.7020	81.5299	81.1527	80.3716	78.9164	75.0000	75.0000	75.0000	75.0000	80.1875	81.2335	81.7147	(217)
Fuel for water heating, kWh/month													
	240.5572	212.1008	225.0520	198.0673	193.7864	181.7115	178.5777	187.4483	191.2372	201.4468	213.2991	237.8591	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.1365	11.3408	10.2111	7.4811	5.7786	4.7212	5.2715	6.8520	8.9001	11.6774	13.1896	14.5293	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3946.3840	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2461.1434	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	114.0893	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6636.6167	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3946.3840	5.6000	220.9975	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	2461.1434	5.6000	137.8240	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	114.0893	26.0600	29.7317	(250)
Additional standing charges			99.0000	(251)
Total energy cost			517.5222	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3946.3840	0.2100	828.7406	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2461.1434	0.2100	516.8401	(264)
Space and water heating			1345.5808	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.0893	0.1443	16.4666	(268)
Total CO2, kg/year			1377.9993	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3946.3840	1.1300	4459.4139	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2461.1434	1.1300	2781.0921	(278)
Space and water heating			7240.5060	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	114.0893	1.5338	174.9939	(282)
Total Primary energy kWh/year			7589.4719	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 3

Current energy efficiency rating: C 78
Current environmental impact rating: B 81

N Solar water heating Not applicable
U Solar photovoltaic panels Not applicable
V2 Wind turbine Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: C 78
Potential environmental impact rating: B 81

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£60	£60	£0
Mains gas	£458	£458	£0
Space heating	£350	£350	£0
Water heating	£138	£138	£0
Lighting	£30	£30	£0
Total cost of fuels	£518	£518	£0
Total cost of uses	£518	£518	£0
Delivered energy	124 kWh/m²	124 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.4 tonnes	1.4 tonnes	0.0 tonnes
CO2 emissions per m²	26 kg/m²	26 kg/m²	0 kg/m²
Primary energy	142 kWh/m²	142 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	53.4100 (1b)	x	3.1000 (2b)	=	165.5710	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	165.5710	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8708	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9437	0.9252	0.9067	0.8142	0.7957	0.7032	0.7032	0.6847	0.7402	0.7957	0.8327	0.8697	(22b)
Effective ac	0.9453	0.9280	0.9111	0.8315	0.8166	0.7472	0.7472	0.7344	0.7739	0.8166	0.8467	0.8782	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Total net area of external elements Aum(A, m2)			98.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		33.7246			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.6680	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	53.3926	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.6501	50.7053	49.7792	45.4294	44.6155	40.8270	40.8270	40.1254	42.2863	44.6155	46.2619	47.9831	(38)
Heat transfer coeff	105.0427	104.0979	103.1718	98.8220	98.0081	94.2196	94.2196	93.5180	95.6789	98.0081	99.6545	101.3757	(39)
Average = Sum(39)m / 12 =												98.8181	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9667	1.9490	1.9317	1.8503	1.8350	1.7641	1.7641	1.7509	1.7914	1.8350	1.8658	1.8981	(40)
HLP (average)												1.8502	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.7906	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)

Average daily hot water use (litres/day)	86.1372 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.8443	42.2410	45.4761	42.1592	41.9937	39.0119	39.7038	40.9894	40.9741	44.1002	44.5546	47.7254	(61)
Total heat required for water heating calculated for each month	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(64)
									Total per year (kWh/year) = Sum(64)m =			1947.6228	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)

Heat gains from water heating, kWh/month

61.4024	54.0129	56.9747	49.4525	47.3845	42.0958	41.2572	43.3633	44.3094	50.0721	53.9366	60.6893	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.1505	14.3447	11.6659	8.8319	6.6019	5.5736	6.0225	7.8283	10.5071	13.3411	15.5711	16.5994	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	232.9540	235.3713	229.2797	216.3114	199.9412	184.5556	174.2771	171.8597	177.9513	190.9196	207.2898	222.6754	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	82.5301	80.3763	76.5788	68.6841	63.6888	58.4664	55.4533	58.2840	61.5408	67.3013	74.9120	81.5717	(72)
Total internal gains													
	421.9819	420.4396	407.8717	384.1746	360.5793	331.9430	319.1001	321.3193	333.3465	361.9093	388.1201	411.1938	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	5.3600	36.7938	0.7600	0.8000	0.7700	83.0953	(79)

Solar gains	104.1792	177.4558	242.8027	300.8443	336.9707	334.5339	322.5264	295.5745	262.9040	196.1264	124.7827	89.1557	(83)
Total gains	526.1611	597.8954	650.6745	685.0189	697.5500	666.4769	641.6265	616.8938	596.2505	558.0358	512.9028	500.3495	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.3097	35.6302	35.9500	37.5324	37.8441	39.3658	39.3658	39.6611	38.7654	37.8441	37.2189	36.5869	
alpha	3.3540	3.3753	3.3967	3.5022	3.5229	3.6244	3.6244	3.6441	3.5844	3.5229	3.4813	3.4391	
util living area													
	0.9876	0.9799	0.9657	0.9339	0.8697	0.7429	0.5920	0.6275	0.8198	0.9420	0.9799	0.9895	(86)
MIT	18.8430	19.0901	19.4756	20.0103	20.4560	20.8053	20.9373	20.9221	20.6920	20.1192	19.4329	18.8662	(87)
Th 2	19.3556	19.3675	19.3793	19.4350	19.4456	19.4953	19.4953	19.5045	19.4760	19.4456	19.4243	19.4022	(88)
util rest of house													
	0.9832	0.9728	0.9528	0.9069	0.8106	0.6234	0.4139	0.4542	0.7209	0.9126	0.9716	0.9858	(89)
MIT 2	17.4964	17.7480	18.1340	18.6877	19.1000	19.4127	19.4822	19.4861	19.3241	18.8074	18.1284	17.5512	(90)
Living area fraction									fLA = Living area / (4) =			0.4520	(91)
MIT	18.1050	18.3546	18.7404	19.2855	19.7129	20.0421	20.1399	20.1351	19.9424	19.4003	18.7180	18.1455	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9550	18.2046	18.5904	19.1355	19.5629	19.8921	19.9899	19.9851	19.7924	19.2503	18.5680	17.9955	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9778	0.9658	0.9444	0.9003	0.8160	0.6590	0.4770	0.5149	0.7452	0.9078	0.9652	0.9811	(94)
Useful gains	514.4823	577.4327	614.4767	616.7393	569.1840	439.2228	306.0657	317.6462	444.3165	506.5666	495.0300	490.8806	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1434.3591	1384.9783	1247.3841	1011.4901	770.6261	498.6205	319.3945	335.2758	544.6383	847.7972	1142.8386	1398.5319	(97)
Space heating kWh													
	684.3884	542.6706	470.8831	284.2206	149.8729	0.0000	0.0000	0.0000	0.0000	253.8755	466.4222	675.2925	(98a)
Space heating requirement - total per year (kWh/year)												3527.6260	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	684.3884	542.6706	470.8831	284.2206	149.8729	0.0000	0.0000	0.0000	0.0000	253.8755	466.4222	675.2925	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3527.6260	
Space heating per m2											(98c) / (4) =	66.0480	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	684.3884	542.6706	470.8831	284.2206	149.8729	0.0000	0.0000	0.0000	0.0000	253.8755	466.4222	675.2925	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	814.7481	646.0365	560.5751	338.3579	178.4202	0.0000	0.0000	0.0000	0.0000	302.2328	555.2645	803.9197	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)

Water heating

Water heating requirement

	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.8097	81.6328	81.2744	80.5306	79.2000	75.0000	75.0000	75.0000	75.0000	80.2551	81.3556	81.8060 (217)
Fuel for water heating, kWh/month												
	240.2404	211.8335	224.7152	197.6763	193.0923	181.7115	178.5777	187.4483	191.2372	201.2771	212.9788	237.5937 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	14.1365	11.3408	10.2111	7.4811	5.7786	4.7212	5.2715	6.8520	8.9001	11.6774	13.1896	14.5293 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year	
Space heating fuel - main system 1	4199.5548 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	75.0000
Water heating fuel used	2458.3819 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
central heating pump	115.0000 (230c)
Total electricity for the above, kWh/year	115.0000 (231)
Electricity for lighting (calculated in Appendix L)	114.0893 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	6887.0259 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4199.5548	3.6400	152.8638	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2458.3819	3.6400	89.4851	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	114.0893	16.4900	18.8133	(250)
Additional standing charges			92.0000	(251)
Total energy cost			372.1257	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.3613	(257)
SAP value		77.9334	
SAP rating (Section 12)		78	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4199.5548	0.2100	881.9065	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2458.3819	0.2100	516.2602	(264)
Space and water heating			1398.1667	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.0893	0.1443	16.4666	(268)
Total CO2, kg/year			1430.5852	(272)
CO2 emissions per m2			26.7800	(273)
EI value			80.5204	
EI rating			81	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	53.4100	(1b)	x 3.1000	(2b) =	165.5710	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	53.4100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		165.5710	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1208 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8708 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7402 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8882	0.8697	0.8512	0.7772	0.7587	0.6847	0.6847	0.6847	0.6847	0.7772	0.7957	0.8327	(22b)
Effective ac	0.8945	0.8782	0.8623	0.8020	0.7878	0.7344	0.7344	0.7344	0.7344	0.8020	0.8166	0.8467	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.7200	1.3258	8.9091			(27)
Heatloss Floor 1			53.4100	0.2500	13.3525			(28a)
External Wall 1	44.9300	6.7200	38.2100	0.3000	11.4630			(29a)
Total net area of external elements Aum(A, m2)			98.3400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		33.7246			(33)
Party Ceiling 1			53.4100					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.6680	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 53.3926	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	48.8718	47.9831	47.1132	43.8204	43.0440	40.1254	40.1254	40.1254	40.1254	43.8204	44.6155	46.2619	(38)
Heat transfer coeff	102.2644	101.3757	100.5058	97.2130	96.4366	93.5180	93.5180	93.5180	93.5180	97.2130	98.0081	99.6545	(39)
Average = Sum(39)m / 12 =												97.2286	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9147	1.8981	1.8818	1.8201	1.8056	1.7509	1.7509	1.7509	1.7509	1.8201	1.8350	1.8658	(40)
HLP (average)												1.8204	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.7906	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
60.9201	60.0046	58.6705	56.1180	54.2343	52.1336	50.9396	52.2636	53.7149	55.9704	58.5777	60.6867	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

32.9679	31.7691	30.5703	29.3714	28.1726	26.9738	26.9738	28.1726	29.3714	30.5703	31.7691	32.9679	(42c)

Average daily hot water use (litres/day)	86.1372 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	93.8880	91.7737	89.2408	85.4894	82.4069	79.1074	77.9134	80.4362	83.0863	86.5407	90.3469	93.6546	(44)
Energy conte	148.6957	130.6845	137.1598	117.0308	110.9355	97.2718	94.2295	99.5968	102.4538	117.4349	128.7157	146.6405	(45)
Energy content (annual)										Total = Sum(45)m =		1430.8492	
Distribution loss (46)m = 0.15 x (45)m	22.3044	19.6027	20.5740	17.5546	16.6403	14.5908	14.1344	14.9395	15.3681	17.6152	19.3073	21.9961	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.8443	42.2410	45.4761	42.1592	41.9937	39.0119	39.7038	40.9894	40.9741	44.1002	44.5546	47.7254	(61)
Total heat required for water heating calculated for each month	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													

	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659	(64)
									Total per year (kWh/year) = Sum(64)m =			1947.6228	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
	61.4024	54.0129	56.9747	49.4525	47.3845	42.0958	41.2572	43.3633	44.3094	50.0721	53.9366	60.6893	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	107.4384	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.1505	14.3447	11.6659	8.8319	6.6019	5.5736	6.0225	7.8283	10.5071	13.3411	15.5711	16.5994	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	232.9540	235.3713	229.2797	216.3114	199.9412	184.5556	174.2771	171.8597	177.9513	190.9196	207.2898	222.6754	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	47.5345	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	-71.6256	(71)
Water heating gains (Table 5)													
	82.5301	80.3763	76.5788	68.6841	63.6888	58.4664	55.4533	58.2840	61.5408	67.3013	74.9120	81.5717	(72)
Total internal gains													
	421.9819	420.4396	407.8717	384.1746	360.5793	331.9430	319.1001	321.3193	333.3465	361.9093	388.1201	411.1938	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)
Southwest	5.3600	33.9635	0.7600	0.8000	0.7700	76.7034	(79)

Solar gains	96.1654	167.5971	240.2735	304.8556	335.2157	339.5519	317.4069	286.1613	262.9040	193.1548	117.2201	84.9102	(83)
Total gains	518.1473	588.0367	648.1453	689.0302	695.7949	671.4949	636.5071	607.4806	596.2505	555.0641	505.3402	496.1040	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	36.2690	36.5869	36.9036	38.1536	38.4608	39.6611	39.6611	39.6611	39.6611	38.1536	37.8441	37.2189	
alpha	3.4179	3.4391	3.4602	3.5436	3.5641	3.6441	3.6441	3.6441	3.6441	3.5436	3.5229	3.4813	
util living area													
	0.9872	0.9796	0.9641	0.9288	0.8580	0.7307	0.6131	0.6444	0.8145	0.9409	0.9789	0.9890	(86)
MIT	18.9646	19.1882	19.5613	20.0754	20.5143	20.8218	20.9278	20.9131	20.7113	20.1431	19.5217	18.9693	(87)
Th 2	19.3908	19.4022	19.4133	19.4559	19.4661	19.5045	19.5045	19.5045	19.5045	19.4559	19.4456	19.4243	(88)
util rest of house													
	0.9826	0.9723	0.9505	0.8998	0.7941	0.6085	0.4416	0.4735	0.7157	0.9107	0.9699	0.9850	(89)
MIT 2	17.6411	17.8689	18.2415	18.7641	19.1658	19.4310	19.4877	19.4828	19.3622	18.8376	18.2310	17.6689	(90)
Living area fraction									fLA = Living area / (4) =			0.4520	(91)
MIT	18.2393	18.4652	18.8380	19.3568	19.7752	20.0596	20.1386	20.1292	19.9719	19.4277	18.8144	18.2566	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.0893	18.3152	18.6880	19.2068	19.6252	19.9096	19.9886	19.9792	19.8219	19.2777	18.6644	18.1066	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9772	0.9654	0.9423	0.8939	0.8020	0.6457	0.5018	0.5331	0.7404	0.9062	0.9635	0.9802	(94)
Useful gains	506.3587	567.6618	610.7441	615.9113	557.9980	433.5714	319.3712	323.8332	441.4404	502.9960	486.8943	486.2898	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1369.2460	1329.5630	1204.8632	982.5127	735.3527	487.1891	335.5997	344.0753	535.1050	833.8609	1094.2017	1345.9976	(97)
Space heating kWh													
	641.9881	511.9976	442.0246	263.9530	131.9519	0.0000	0.0000	0.0000	0.0000	246.1635	437.2614	639.6226	(98a)
Space heating requirement - total per year (kWh/year)												3314.9626	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	641.9881	511.9976	442.0246	263.9530	131.9519	0.0000	0.0000	0.0000	0.0000	246.1635	437.2614	639.6226	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3314.9626	
Space heating per m2											(98c) / (4) =	62.0663	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	641.9881	511.9976	442.0246	263.9530	131.9519	0.0000	0.0000	0.0000	0.0000	246.1635	437.2614	639.6226	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	764.2715	609.5209	526.2197	314.2298	157.0856	0.0000	0.0000	0.0000	0.0000	293.0517	520.5492	761.4555	(211)
Space heating efficiency (main heating system 2)													

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating												
Water heating requirement												
	196.5400	172.9256	182.6359	159.1899	152.9292	136.2836	133.9333	140.5862	143.4279	161.5351	173.2703	194.3659 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.7020	81.5299	81.1527	80.3716	78.9164	75.0000	75.0000	75.0000	75.0000	80.1875	81.2335	81.7147 (217)
Fuel for water heating, kWh/month												
	240.5572	212.1008	225.0520	198.0673	193.7864	181.7115	178.5777	187.4483	191.2372	201.4468	213.2991	237.8591 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	14.1365	11.3408	10.2111	7.4811	5.7786	4.7212	5.2715	6.8520	8.9001	11.6774	13.1896	14.5293 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3946.3840	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2461.1434	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	114.0893	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6636.6167	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3946.3840	5.6000	220.9975	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2461.1434	5.6000	137.8240	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	114.0893	26.0600	29.7317	(250)
Additional standing charges			99.0000	(251)
Total energy cost			517.5222	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3946.3840	0.2100	828.7406	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2461.1434	0.2100	516.8401	(264)
Space and water heating			1345.5808	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.0893	0.1443	16.4666	(268)
Total CO2, kg/year			1377.9993	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3946.3840	1.1300	4459.4139	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2461.1434	1.1300	2781.0921	(278)
Space and water heating			7240.5060	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	114.0893	1.5338	174.9939	(282)
Total Primary energy kWh/year			7589.4719	(286)

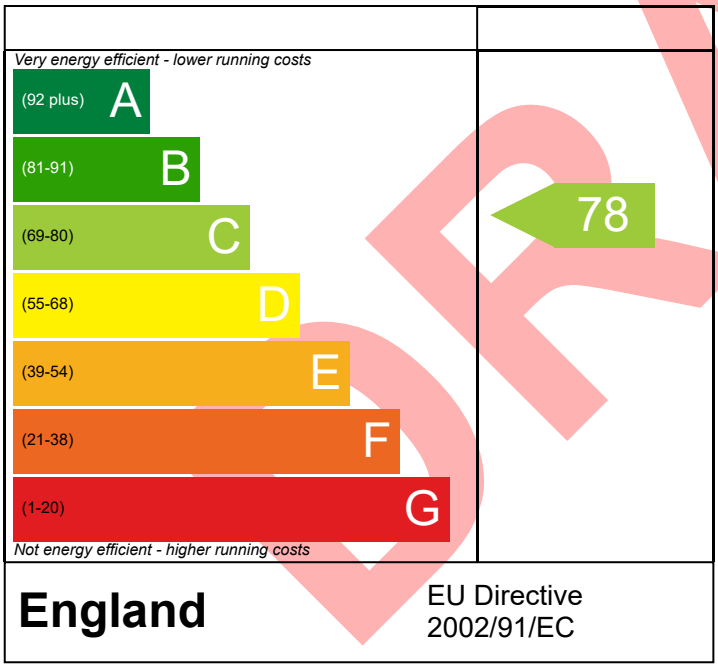
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	53.41 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

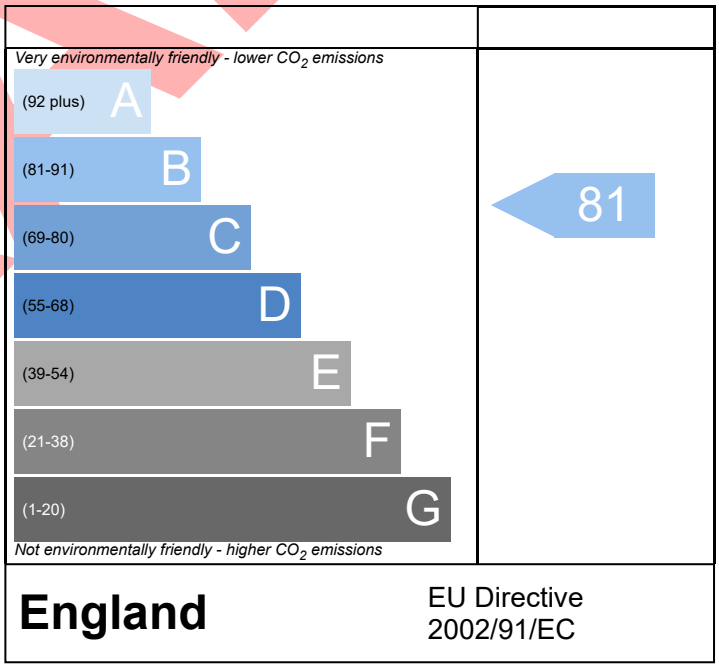
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

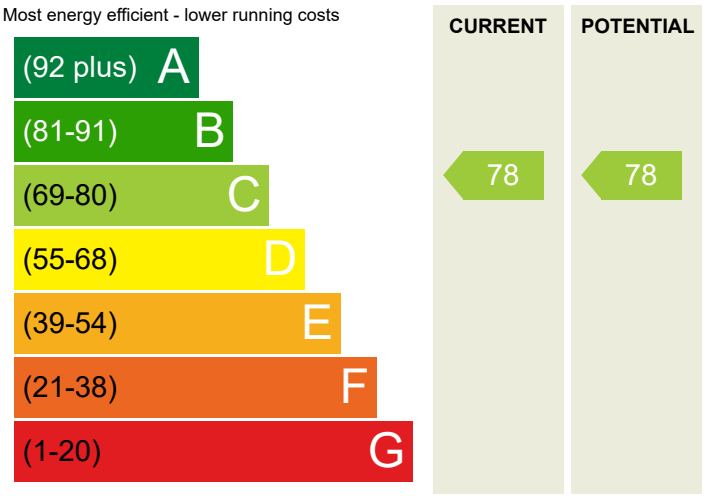
Energy Report

Dwelling Address	
Reference	Apt. 3-Apt. 3
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	53

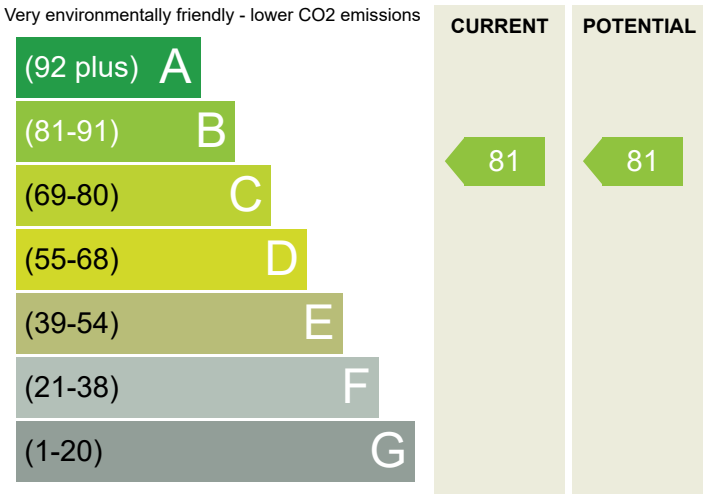
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

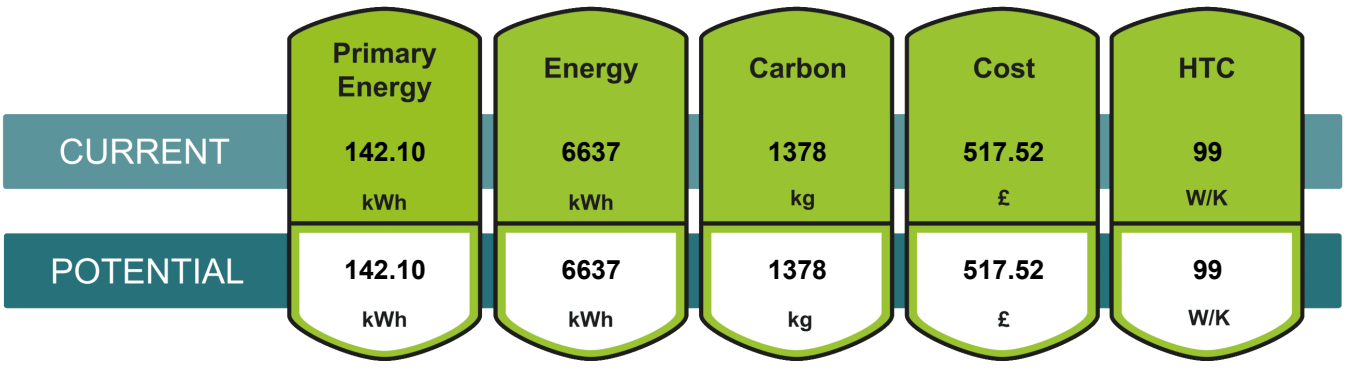
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£30	£30	You could save £0
Heating	£350	£350	
Hot Water	£138	£138	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£518	£518	

Estimated energy use and potential savings

Space Heating
3946
kWh per year

Water Heating
2461
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 3	Issued on Date	01/10/2024
Assessment Reference	Apt. 3	Prop Type Ref	Detached Flat
Property			

SAP Rating	78 C	DER	27.37	TER	
Environmental	81 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.38	DFEE	74.40	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	150.52	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1	
Type	Solid Wall	
Construction	Other	
U-value	0.30	W/m²K U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	44.93	m²

Comments

Heat Loss Floors

Dwelling Sign Off Report

elmhurst energy

Description	Heatloss Floor 1		
Type	Ground Floor - Timber		
Construction	Other		
U-value	0.25	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	53.41	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SW1	New Glazing	External Wall 1	South West	5.36
W SE1	New Glazing	External Wall 1	South East	1.36

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1

SAP table

Fuel Type	Mains gas	
Winter Efficiency	84.00	%
Summer Efficiency	75.00	%
Model Name		
Manufacturer		
System Type		
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Flow Temperature Value		

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2 None

Secondary Heating None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Dwelling Sign Off Report

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 4	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 4	**Prop Type Ref**	
Property			

SAP Rating	81 B	**DER**	22.36	**TER**	
Environmental	84 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.15	**DFEE**	54.11	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	123.62	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	24.68 m	54.51 m²	2.67 m

8.0 Living Area	22.10	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	18.15	12.75	0.00	None	5.40	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	4.58	4.58	None	0.00	Enter Gross Area	0.00

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	49.93

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Other	0.25	None	0.00	0.00	54.51

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40

Summary for Input Data

Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SE1	New Glazing	External Wall 1	South East	5.40	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	
25.0 Main Heating 2	None	

Summary for Input Data

elmhurst energy

26.0 Heat Networks None

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating None

28.0 Water Heating

Water Heating	Main Heating 1	
SAP Code	901	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
Immersion Heater	Single	
Summer Immersion	No	
Cold Water Source	From mains	
Bath Count	0	
Supplementary Immersion	No	
Immersion Only Heating Hot Water	No	

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder None

Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	

31.0 Thermal Store None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 4	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 4	**Prop Type Ref**	
Property			

SAP Rating	81 B	**DER**	22.36	**TER**	
Environmental	84 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.15	**DFEE**	54.11	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	123.62	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b)	x 2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

---

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8769	0.8597	0.8425	0.7565	0.7393	0.6534	0.6534	0.6362	0.6877	0.7393	0.7737	0.8081	(22b)
Effective ac	0.8845	0.8695	0.8549	0.7862	0.7733	0.7134	0.7134	0.7024	0.7365	0.7733	0.7993	0.8265	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			77.2400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.3444			(33)
Party Ceiling 1			49.9300					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							15.4480	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		40.7924	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	42.4795	41.7624	41.0596	37.7585	37.1408	34.2657	34.2657	33.7332	35.3731	37.1408	38.3903	39.6966	(38)
Heat transfer coeff	83.2719	82.5548	81.8520	78.5509	77.9332	75.0581	75.0581	74.5256	76.1655	77.9332	79.1827	80.4890	(39)
Average = Sum(39)m / 12 =												78.5479	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5276	1.5145	1.5016	1.4410	1.4297	1.3770	1.3770	1.3672	1.3973	1.4297	1.4526	1.4766	(40)
HLP (average)												1.4410	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8230	(42)
Hot water usage for mixer showers													
	61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)
Average daily hot water use (litres/day)												87.0022	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)										Total = Sum(45)m =		1445.2196	
Distribution loss (46)m = 0.15 x (45)m													
	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.3248	42.6653	45.9329	42.5826	42.4154	39.4037	40.1026	41.4011	41.3856	44.5431	45.0021	48.2047	(61)
Total heat required for water heating calculated for each month													
	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(64)
										Total per year (kWh/year) = Sum(64)m =		1967.1833	(64)
12Total per year (kWh/year)												1967	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	62.0191	54.5553	57.5469	49.9492	47.8604	42.5186	41.6716	43.7988	44.7544	50.5750	54.4783	61.2988	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	90.1209	99.7767	90.1209	93.1249	90.1209	93.1249	90.1209	90.1209	93.1249	90.1209	93.1249	90.1209	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	158.9219	160.5710	156.4153	147.5683	136.4005	125.9044	118.8924	117.2433	121.3990	130.2460	141.4137	151.9099	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)													
	83.3590	81.1835	77.3479	69.3739	64.3285	59.0536	56.0102	58.8693	62.1589	67.9772	75.6643	82.3909	(72)
Total internal gains													
	389.7466	398.8761	381.2290	367.4119	348.1947	328.4278	315.3683	316.5783	327.0276	345.6889	367.5478	381.7665	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	36.7938	0.7600	0.8000	0.7700	83.7154	(77)

Solar gains	83.7154	142.5984	195.1093	241.7499	270.7800	268.8219	259.1730	237.5152	211.2621	157.6016	100.2718	71.6430	(83)
Total gains	473.4621	541.4745	576.3383	609.1618	618.9748	597.2497	574.5413	554.0935	538.2898	503.2905	467.8196	453.4095	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.4585	45.8534	46.2471	48.1906	48.5726	50.4332	50.4332	50.7935	49.6999	48.5726	47.8061	47.0303	
alpha	4.0306	4.0569	4.0831	4.2127	4.2382	4.3622	4.3622	4.3862	4.3133	4.2382	4.1871	4.1354	
util living area													
	0.9914	0.9843	0.9724	0.9389	0.8670	0.7159	0.5518	0.5876	0.8019	0.9452	0.9838	0.9927	(86)
MIT	19.3049	19.5318	19.8422	20.2930	20.6480	20.9003	20.9750	20.9674	20.8234	20.3735	19.8064	19.3256	(87)
Th 2	19.6668	19.6767	19.6863	19.7320	19.7406	19.7810	19.7810	19.7886	19.7654	19.7406	19.7232	19.7051	(88)
util rest of house													
	0.9885	0.9790	0.9625	0.9157	0.8140	0.6123	0.4103	0.4477	0.7130	0.9197	0.9774	0.9903	(89)
MIT 2	18.1734	18.4046	18.7167	19.1847	19.5109	19.7372	19.7753	19.7802	19.6756	19.2738	18.7125	18.2221	(90)
Living area fraction									fLA = Living area / (4) =			0.4054	(91)
MIT	18.6322	18.8616	19.1730	19.6341	19.9719	20.2088	20.2617	20.2615	20.1409	19.7196	19.1560	18.6695	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.4822	18.7116	19.0230	19.4841	19.8219	20.0588	20.1117	20.1115	19.9909	19.5696	19.0060	18.5195	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9848	0.9738	0.9559	0.9101	0.8180	0.6380	0.4503	0.4870	0.7315	0.9153	0.9725	0.9871	(94)
Useful gains	466.2640	527.2850	550.9422	554.4164	506.3378	381.0696	258.7411	269.8664	393.7534	460.6407	454.9452	447.5550	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1180.9757	1140.2168	1025.0352	831.3892	632.9678	409.7262	263.5806	276.6040	448.6872	699.0319	942.7496	1152.5581	(97)
Space heating kWh													
	531.7455	411.8902	352.7252	199.4204	94.2127	0.0000	0.0000	0.0000	0.0000	177.3631	351.2191	524.5223	(98a)
Space heating requirement - total per year (kWh/year)												2643.0985	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	531.7455	411.8902	352.7252	199.4204	94.2127	0.0000	0.0000	0.0000	0.0000	177.3631	351.2191	524.5223	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2643.0985	
Space heating per m2											(98c) / (4) =	48.4883	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	531.7455	411.8902	352.7252	199.4204	94.2127	0.0000	0.0000	0.0000	0.0000	177.3631	351.2191	524.5223	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	633.0304	490.3454	419.9110	237.4052	112.1579	0.0000	0.0000	0.0000	0.0000	211.1465	418.1180	624.4313	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.3464	81.1020	80.6756	79.7293	78.1732	75.0000	75.0000	75.0000	75.0000	79.4329	80.7763	81.3416	(217)
Fuel for water heating, kWh/month													
	244.0353	215.3614	228.6568	201.6683	197.5935	183.5365	180.3712	189.3309	193.1578	205.4029	216.6607	241.3499	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.1125	12.1238	10.9161	7.9976	6.1776	5.0472	5.6354	7.3251	9.5146	12.4837	14.1003	15.5325	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3146.5458	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2497.1251	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	121.9665	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5880.6374	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3146.5458	0.2100	660.7746	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2497.1251	0.2100	524.3963	(264)
Space and water heating			1185.1709	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	121.9665	0.1443	17.6035	(268)
Total CO2, kg/year			1218.7263	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			22.3600	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3146.5458	1.1300	3555.5968	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2497.1251	1.1300	2821.7514	(278)
Space and water heating			6377.3482	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	121.9665	1.5338	187.0762	(282)
Total Primary energy kWh/year			6738.3964	(286)
Dwelling Primary energy Rate (DPER)			123.6200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 4	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 4	**Prop Type Ref**	
Property			

SAP Rating	81 B	**DER**	22.36	**TER**	
Environmental	84 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.15	**DFEE**	54.11	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	123.62	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b)	x 2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8769	0.8597	0.8425	0.7565	0.7393	0.6534	0.6534	0.6362	0.6877	0.7393	0.7737	0.8081	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.8845	0.8695	0.8549	0.7862	0.7733	0.7134	0.7134	0.7024	0.7365	0.7733	0.7993	0.8265	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			77.2400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.3444			(33)
Party Ceiling 1			49.9300					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	15.4480	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 40.7924	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	42.4795	41.7624	41.0596	37.7585	37.1408	34.2657	34.2657	33.7332	35.3731	37.1408	38.3903	39.6966	(38)
Heat transfer coeff	83.2719	82.5548	81.8520	78.5509	77.9332	75.0581	75.0581	74.5256	76.1655	77.9332	79.1827	80.4890	(39)

Average = Sum(39)m / 12 = 78.5479

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5276	1.5145	1.5016	1.4410	1.4297	1.3770	1.3770	1.3672	1.3973	1.4297	1.4526	1.4766	(40)
HLP (average)												1.4410	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8230 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)

Hot water usage for baths

23.6826	23.3309	22.8356	21.9223	21.2385	20.4803	20.0707	20.5625	21.0980	21.9094	22.8414	23.6025	(42b)

Hot water usage for other uses

33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)

Average daily hot water use (litres/day) 52.2295 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	56.9818	55.4192	53.7130	51.5889	49.6942	47.7251	47.3155	49.0182	50.7646	52.7869	54.9298	56.9017	(44)
Energy conte	90.2453	78.9162	82.5549	70.6226	66.8980	58.6836	57.2240	60.6948	62.5979	71.6313	78.2575	89.0944	(45)
Energy content (annual)											Total = Sum(45)m =	867.4204	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	76.7085	67.0788	70.1717	60.0292	56.8633	49.8810	48.6404	51.5906	53.2082	60.8866	66.5189	75.7302	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	76.7085	67.0788	70.1717	60.0292	56.8633	49.8810	48.6404	51.5906	53.2082	60.8866	66.5189	75.7302	(64)
										Total per year (kWh/year) = Sum(64)m =		737.3074	(64)
12Total per year (kWh/year)												737	(64)
Electric shower(s)													
	43.8737	39.0918	42.6868	40.7355	41.4998	39.5868	40.9064	41.4998	40.7355	42.6868	41.8841	43.8737	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		499.0606	(64a)
Heat gains from water heating, kWh/month													
	30.1455	26.5426	28.2146	25.1912	24.5908	22.3670	22.3867	23.2726	23.4859	25.8933	27.1007	29.9010	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	90.1209	99.7767	90.1209	93.1249	90.1209	93.1249	90.1209	90.1209	93.1249	90.1209	93.1249	90.1209	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	158.9219	160.5710	156.4153	147.5683	136.4005	125.9044	118.8924	117.2433	121.3990	130.2460	141.4137	151.9099	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)													
	40.5182	39.4980	37.9229	34.9877	33.0521	31.0652	30.0897	31.2804	32.6193	34.8029	37.6399	40.1895	(72)
Total internal gains													
	339.9058	350.1906	334.8039	326.0258	309.9184	300.4394	289.4477	288.9894	297.4880	305.5146	322.5234	332.5651	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	36.7938	0.7600	0.8000	0.7700	83.7154	(77)

Solar gains	83.7154	142.5984	195.1093	241.7499	270.7800	268.8219	259.1730	237.5152	211.2621	157.6016	100.2718	71.6430	(83)
Total gains	423.6213	492.7889	529.9132	567.7757	580.6984	569.2613	548.6207	526.5046	508.7502	463.1162	422.7952	404.2081	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.4585	45.8534	46.2471	48.1906	48.5726	50.4332	50.4332	50.7935	49.6999	48.5726	47.8061	47.0303	
alpha	4.0306	4.0569	4.0831	4.2127	4.2382	4.3622	4.3622	4.3862	4.3133	4.2382	4.1871	4.1354	
util living area													
	0.9942	0.9887	0.9791	0.9507	0.8869	0.7387	0.5740	0.6127	0.8247	0.9578	0.9887	0.9952	(86)
MIT	19.2162	19.4474	19.7654	20.2330	20.6075	20.8870	20.9710	20.9618	20.8006	20.3134	19.7277	19.2368	(87)
Th 2	19.6668	19.6767	19.6863	19.7320	19.7406	19.7810	19.7810	19.7886	19.7654	19.7406	19.7232	19.7051	(88)
util rest of house													
	0.9922	0.9848	0.9714	0.9311	0.8386	0.6360	0.4286	0.4695	0.7396	0.9370	0.9841	0.9936	(89)
MIT 2	18.0857	18.3220	18.6428	19.1303	19.4793	19.7303	19.7742	19.7785	19.6615	19.2196	18.6357	18.1341	(90)
Living area fraction										fLA = Living area / (4) =		0.4054	(91)
MIT	18.5440	18.7782	19.0979	19.5774	19.9367	20.1993	20.2594	20.2582	20.1233	19.6631	19.0785	18.5812	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.5440	18.7782	19.0979	19.5774	19.9367	20.1993	20.2594	20.2582	20.1233	19.6631	19.0785	18.5812	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9898	0.9811	0.9668	0.9282	0.8473	0.6743	0.4881	0.5280	0.7676	0.9354	0.9809	0.9916	(94)
Useful gains	419.3035	483.4977	512.3185	526.9864	492.0344	383.8348	267.7928	277.9779	390.5176	433.1814	414.7191	400.8003	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1186.1273	1145.7158	1031.1660	838.7161	641.9101	420.2702	274.6680	287.5356	458.7701	706.3137	948.4865	1157.5256	(97)
Space heating kWh													
	570.5169	445.0106	386.0225	224.4454	111.5075	0.0000	0.0000	0.0000	0.0000	203.2105	384.3125	563.0036	(98a)
Space heating requirement - total per year (kWh/year)												2888.0295	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	570.5169	445.0106	386.0225	224.4454	111.5075	0.0000	0.0000	0.0000	0.0000	203.2105	384.3125	563.0036	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2888.0295	
Space heating per m2											(98c) / (4) =	52.9816	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	705.5457	555.4296	566.3946	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7614	0.8454	0.8233	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	537.1768	469.5878	466.3213	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	625.2956	603.2114	579.1811	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	63.4456	99.4159	83.9677	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction											fC = cooled area / (4) =	1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	15.8614	24.8540	20.9919	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												61.7073	(107)
Energy for space heating												52.9816	(99)
Energy for space cooling												1.1320	(108)
Total												54.1137	(109)
Fabric Energy Efficiency (DFEE)												54.1	(109)

Full SAP Calculation Printout

Property Reference	Apt. 4	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 4	**Prop Type Ref**	
Property			

SAP Rating	81 B	**DER**	22.36	**TER**	
Environmental	84 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.15	**DFEE**	54.11	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	123.62	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b)	x 2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

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2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8769	0.8597	0.8425	0.7565	0.7393	0.6534	0.6534	0.6362	0.6877	0.7393	0.7737	0.8081	(22b)
Effective ac	0.8845	0.8695	0.8549	0.7862	0.7733	0.7134	0.7134	0.7024	0.7365	0.7733	0.7993	0.8265	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			77.2400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.3444			(33)
Party Ceiling 1			49.9300					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							15.4480	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		40.7924	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	42.4795	41.7624	41.0596	37.7585	37.1408	34.2657	34.2657	33.7332	35.3731	37.1408	38.3903	39.6966	(38)
Heat transfer coeff	83.2719	82.5548	81.8520	78.5509	77.9332	75.0581	75.0581	74.5256	76.1655	77.9332	79.1827	80.4890	(39)
Average = Sum(39)m / 12 =												78.5479	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5276	1.5145	1.5016	1.4410	1.4297	1.3770	1.3770	1.3672	1.3973	1.4297	1.4526	1.4766	(40)
HLP (average)												1.4410	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8230	(42)
Hot water usage for mixer showers													
	61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)
Average daily hot water use (litres/day)												87.0022	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)										Total = Sum(45)m =		1445.2196	
Distribution loss (46)m = 0.15 x (45)m													
	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.3248	42.6653	45.9329	42.5826	42.4154	39.4037	40.1026	41.4011	41.3856	44.5431	45.0021	48.2047	(61)
Total heat required for water heating calculated for each month													
	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(64)
										Total per year (kWh/year) = Sum(64)m =		1967.1833	(64)
12Total per year (kWh/year)												1967	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	62.0191	54.5553	57.5469	49.9492	47.8604	42.5186	41.6716	43.7988	44.7544	50.5750	54.4783	61.2988	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	91.1494	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	90.1209	99.7767	90.1209	93.1249	90.1209	93.1249	90.1209	90.1209	93.1249	90.1209	93.1249	90.1209	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	158.9219	160.5710	156.4153	147.5683	136.4005	125.9044	118.8924	117.2433	121.3990	130.2460	141.4137	151.9099	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	32.1149	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)													
	83.3590	81.1835	77.3479	69.3739	64.3285	59.0536	56.0102	58.8693	62.1589	67.9772	75.6643	82.3909	(72)
Total internal gains													
	389.7466	398.8761	381.2290	367.4119	348.1947	328.4278	315.3683	316.5783	327.0276	345.6889	367.5478	381.7665	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	36.7938	0.7600	0.8000	0.7700	83.7154	(77)

Solar gains	83.7154	142.5984	195.1093	241.7499	270.7800	268.8219	259.1730	237.5152	211.2621	157.6016	100.2718	71.6430	(83)
Total gains	473.4621	541.4745	576.3383	609.1618	618.9748	597.2497	574.5413	554.0935	538.2898	503.2905	467.8196	453.4095	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.4585	45.8534	46.2471	48.1906	48.5726	50.4332	50.4332	50.7935	49.6999	48.5726	47.8061	47.0303	
alpha	4.0306	4.0569	4.0831	4.2127	4.2382	4.3622	4.3622	4.3862	4.3133	4.2382	4.1871	4.1354	
util living area													
	0.9914	0.9843	0.9724	0.9389	0.8670	0.7159	0.5518	0.5876	0.8019	0.9452	0.9838	0.9927	(86)
MIT	19.3049	19.5318	19.8422	20.2930	20.6480	20.9003	20.9750	20.9674	20.8234	20.3735	19.8064	19.3256	(87)
Th 2	19.6668	19.6767	19.6863	19.7320	19.7406	19.7810	19.7810	19.7886	19.7654	19.7406	19.7232	19.7051	(88)
util rest of house													
	0.9885	0.9790	0.9625	0.9157	0.8140	0.6123	0.4103	0.4477	0.7130	0.9197	0.9774	0.9903	(89)
MIT 2	18.1734	18.4046	18.7167	19.1847	19.5109	19.7372	19.7753	19.7802	19.6756	19.2738	18.7125	18.2221	(90)
Living area fraction									fLA = Living area / (4) =			0.4054	(91)
MIT	18.6322	18.8616	19.1730	19.6341	19.9719	20.2088	20.2617	20.2615	20.1409	19.7196	19.1560	18.6695	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.4822	18.7116	19.0230	19.4841	19.8219	20.0588	20.1117	20.1115	19.9909	19.5696	19.0060	18.5195	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9848	0.9738	0.9559	0.9101	0.8180	0.6380	0.4503	0.4870	0.7315	0.9153	0.9725	0.9871	(94)
Useful gains	466.2640	527.2850	550.9422	554.4164	506.3378	381.0696	258.7411	269.8664	393.7534	460.6407	454.9452	447.5550	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1180.9757	1140.2168	1025.0352	831.3892	632.9678	409.7262	263.5806	276.6040	448.6872	699.0319	942.7496	1152.5581	(97)
Space heating kWh													
	531.7455	411.8902	352.7252	199.4204	94.2127	0.0000	0.0000	0.0000	0.0000	177.3631	351.2191	524.5223	(98a)
Space heating requirement - total per year (kWh/year)												2643.0985	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	531.7455	411.8902	352.7252	199.4204	94.2127	0.0000	0.0000	0.0000	0.0000	177.3631	351.2191	524.5223	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2643.0985	
Space heating per m2											(98c) / (4) =	48.4883	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	531.7455	411.8902	352.7252	199.4204	94.2127	0.0000	0.0000	0.0000	0.0000	177.3631	351.2191	524.5223	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	633.0304	490.3454	419.9110	237.4052	112.1579	0.0000	0.0000	0.0000	0.0000	211.1465	418.1180	624.4313	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.3464	81.1020	80.6756	79.7293	78.1732	75.0000	75.0000	75.0000	75.0000	79.4329	80.7763	81.3416	(217)
Fuel for water heating, kWh/month													
	244.0353	215.3614	228.6568	201.6683	197.5935	183.5365	180.3712	189.3309	193.1578	205.4029	216.6607	241.3499	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.1125	12.1238	10.9161	7.9976	6.1776	5.0472	5.6354	7.3251	9.5146	12.4837	14.1003	15.5325	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3146.5458	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2497.1251	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	121.9665	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5880.6374	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3146.5458	0.2100	660.7746	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2497.1251	0.2100	524.3963	(264)
Space and water heating			1185.1709	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	121.9665	0.1443	17.6035	(268)
Total CO2, kg/year			1218.7263	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			22.3600	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3146.5458	1.1300	3555.5968	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2497.1251	1.1300	2821.7514	(278)
Space and water heating			6377.3482	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	121.9665	1.5338	187.0762	(282)
Total Primary energy kWh/year			6738.3964	(286)
Dwelling Primary energy Rate (DPER)			123.6200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 4	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 4	**Prop Type Ref**	
Property			

SAP Rating	81 B	**DER**	22.36	**TER**	
Environmental	84 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.15	**DFEE**	54.11	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	123.62	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		54.5100 (1b)	x	2.6700 (2b)	=	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	145.5417	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8769	0.8597	0.8425	0.7565	0.7393	0.6534	0.6534	0.6362	0.6877	0.7393	0.7737	0.8081	(22b)
Effective ac	0.8845	0.8695	0.8549	0.7862	0.7733	0.7134	0.7134	0.7024	0.7365	0.7733	0.7993	0.8265	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			77.2400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.3444			(33)
Party Ceiling 1			49.9300					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	15.4480	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	40.7924	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	42.4795	41.7624	41.0596	37.7585	37.1408	34.2657	34.2657	33.7332	35.3731	37.1408	38.3903	39.6966	(38)
Heat transfer coeff	83.2719	82.5548	81.8520	78.5509	77.9332	75.0581	75.0581	74.5256	76.1655	77.9332	79.1827	80.4890	(39)
Average = Sum(39)m / 12 =												78.5479	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5276	1.5145	1.5016	1.4410	1.4297	1.3770	1.3770	1.3672	1.3973	1.4297	1.4526	1.4766	(40)
HLP (average)												1.4410	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8230	(42)
Hot water usage for mixer showers													
	61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)
Average daily hot water use (litres/day)												87.0022	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)										Total = Sum(45)m =		1445.2196	
Distribution loss (46)m = 0.15 x (45)m													
	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.3248	42.6653	45.9329	42.5826	42.4154	39.4037	40.1026	41.4011	41.3856	44.5431	45.0021	48.2047	(61)
Total heat required for water heating calculated for each month													
	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(64)
										Total per year (kWh/year) = Sum(64)m =		1967.1833	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	62.0191	54.5553	57.5469	49.9492	47.8604	42.5186	41.6716	43.7988	44.7544	50.5750	54.4783	61.2988	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.2656	15.3352	12.4714	9.4416	7.0577	5.9584	6.4383	8.3688	11.2325	14.2623	16.6462	17.7455	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	237.1969	239.6583	233.4557	220.2512	203.5829	187.9170	177.4513	174.9899	181.1925	194.3970	211.0653	226.7311	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)													
	83.3590	81.1835	77.3479	69.3739	64.3285	59.0536	56.0102	58.8693	62.1589	67.9772	75.6643	82.3909	(72)
Total internal gains													
	429.0422	427.3976	414.4957	390.2874	366.1898	337.1498	324.1205	326.4487	338.8046	367.8571	394.5965	418.0882	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	36.7938	0.7600	0.8000	0.7700	83.7154	(77)

Solar gains	83.7154	142.5984	195.1093	241.7499	270.7800	268.8219	259.1730	237.5152	211.2621	157.6016	100.2718	71.6430	(83)
Total gains	512.7576	569.9960	609.6050	632.0373	636.9698	605.9717	583.2935	563.9639	550.0667	525.4587	494.8683	489.7312	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.4585	45.8534	46.2471	48.1906	48.5726	50.4332	50.4332	50.7935	49.6999	48.5726	47.8061	47.0303	
alpha	4.0306	4.0569	4.0831	4.2127	4.2382	4.3622	4.3622	4.3862	4.3133	4.2382	4.1871	4.1354	
util living area													
	0.9886	0.9813	0.9669	0.9318	0.8574	0.7090	0.5446	0.5790	0.7928	0.9375	0.9803	0.9904	(86)
MIT	19.3740	19.5804	19.8958	20.3248	20.6658	20.9042	20.9762	20.9692	20.8317	20.4052	19.8528	19.3904	(87)
Th 2	19.6668	19.6767	19.6863	19.7320	19.7406	19.7810	19.7810	19.7886	19.7654	19.7406	19.7232	19.7051	(88)
util rest of house													
	0.9848	0.9752	0.9553	0.9067	0.8024	0.6051	0.4044	0.4404	0.7026	0.9093	0.9727	0.9872	(89)
MIT 2	18.2415	18.4521	18.7678	19.2132	19.5245	19.7392	19.7756	19.7807	19.6807	19.3018	18.7574	18.2860	(90)
Living area fraction										fLA = Living area / (4) =		0.4054	(91)
MIT	18.7006	18.9095	19.2251	19.6639	19.9872	20.2115	20.2624	20.2626	20.1473	19.7491	19.2015	18.7338	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.5506	18.7595	19.0751	19.5139	19.8372	20.0615	20.1124	20.1126	19.9973	19.5991	19.0515	18.5838	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9804	0.9694	0.9484	0.9014	0.8073	0.6311	0.4441	0.4794	0.7218	0.9054	0.9673	0.9834	(94)
Useful gains	502.7163	552.5485	578.1305	569.7175	514.2252	382.4410	259.0449	270.3431	397.0268	475.7374	478.6703	481.5801	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1186.6754	1144.1713	1029.2999	833.7298	634.1572	409.9282	263.6317	276.6815	449.1731	701.3303	946.3530	1157.7340	(97)
Space heating kWh	508.8656	397.5705	335.6700	190.0888	89.2295	0.0000	0.0000	0.0000	0.0000	167.8411	336.7315	503.0585	(98a)
Space heating requirement - total per year (kWh/year)												2529.0556	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	508.8656	397.5705	335.6700	190.0888	89.2295	0.0000	0.0000	0.0000	0.0000	167.8411	336.7315	503.0585	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2529.0556	
Space heating per m2											(98c) / (4) =	46.3962	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	508.8656	397.5705	335.6700	190.0888	89.2295	0.0000	0.0000	0.0000	0.0000	167.8411	336.7315	503.0585	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	605.7923	473.2982	399.6072	226.2962	106.2255	0.0000	0.0000	0.0000	0.0000	199.8109	400.8709	598.8792	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.2634	81.0320	80.5710	79.6216	78.0624	75.0000	75.0000	75.0000	75.0000	79.3088	80.6886	81.2627	(217)
Fuel for water heating, kWh/month	244.2846	215.5473	228.9535	201.9410	197.8738	183.5365	180.3712	189.3309	193.1578	205.7242	216.8961	241.5844	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.1125	12.1238	10.9161	7.9976	6.1776	5.0472	5.6354	7.3251	9.5146	12.4837	14.1003	15.5325	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3010.7804	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2499.2012	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	121.9665	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5746.9480	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3010.7804	3.6400	109.5924	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2499.2012	3.6400	90.9709	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	121.9665	16.4900	20.1123	(250)
Additional standing charges			92.0000	(251)
Total energy cost			331.6391	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.1998	(257)
SAP value		80.5516	
SAP rating (Section 12)		81	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3010.7804	0.2100	632.2639	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2499.2012	0.2100	524.8322	(264)
Space and water heating			1157.0961	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	121.9665	0.1443	17.6035	(268)
Total CO2, kg/year			1190.6516	(272)
CO2 emissions per m2			21.8400	(273)
EI value			83.9667	
EI rating			84	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b) x	2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	145.5417	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8253	0.8081	0.7909	0.7221	0.7049	0.6362	0.6362	0.6362	0.6362	0.7221	0.7393	0.7737	(22b)
Effective ac	0.8406	0.8265	0.8128	0.7607	0.7485	0.7024	0.7024	0.7024	0.7024	0.7607	0.7733	0.7993	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			77.2400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.3444			(33)
Party Ceiling 1			49.9300					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							15.4480	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		40.7924	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	40.3710	39.6966	39.0363	36.5374	35.9482	33.7332	33.7332	33.7332	33.7332	36.5374	37.1408	38.3903	(38)
Heat transfer coeff	81.1634	80.4890	79.8287	77.3298	76.7406	74.5256	74.5256	74.5256	74.5256	77.3298	77.9332	79.1827	(39)
Average = Sum(39)m / 12 =												77.3416	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4890	1.4766	1.4645	1.4186	1.4078	1.3672	1.3672	1.3672	1.3672	1.4186	1.4297	1.4526	(40)
HLP (average)												1.4189	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8230 (42)

Hot water usage for mixer showers

61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)

Average daily hot water use (litres/day) 87.0022 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)										Total = Sum(45)m =		1445.2196	
Distribution loss (46)m = 0.15 x (45)m	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.3248	42.6653	45.9329	42.5826	42.4154	39.4037	40.1026	41.4011	41.3856	44.5431	45.0021	48.2047	(61)
Total heat required for water heating calculated for each month	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(64)
									Total per year (kWh/year) = Sum(64)m =			1967.1833	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	62.0191	54.5553	57.5469	49.9492	47.8604	42.5186	41.6716	43.7988	44.7544	50.5750	54.4783	61.2988	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.2656	15.3352	12.4714	9.4416	7.0577	5.9584	6.4383	8.3688	11.2325	14.2623	16.6462	17.7455	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	237.1969	239.6583	233.4557	220.2512	203.5829	187.9170	177.4513	174.9899	181.1925	194.3970	211.0653	226.7311	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)
Water heating gains (Table 5)	83.3590	81.1835	77.3479	69.3739	64.3285	59.0536	56.0102	58.8693	62.1589	67.9772	75.6643	82.3909	(72)
Total internal gains	429.0422	427.3976	414.4957	390.2874	366.1898	337.1498	324.1205	326.4487	338.8046	367.8571	394.5965	418.0882	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	33.9635	0.7600	0.8000	0.7700	77.2758	(77)

Solar gains	77.2758	134.6762	193.0769	244.9732	269.3697	272.8542	255.0591	229.9510	211.2621	155.2137	94.1947	68.2314	(83)
Total gains	506.3180	562.0739	607.5726	635.2606	635.5595	610.0040	579.1796	556.3997	550.0667	523.0708	488.7912	486.3196	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	46.6395	47.0303	47.4192	48.9516	49.3274	50.7935	50.7935	50.7935	50.7935	48.9516	48.5726	47.8061	
alpha	4.1093	4.1354	4.1613	4.2634	4.2885	4.3862	4.3862	4.3862	4.3862	4.2634	4.2382	4.1871	
util living area	0.9880	0.9806	0.9647	0.9256	0.8430	0.6953	0.5662	0.5961	0.7859	0.9358	0.9788	0.9897	(86)
MIT	19.4761	19.6626	19.9669	20.3772	20.7091	20.9142	20.9718	20.9648	20.8450	20.4244	19.9266	19.4767	(87)
Th 2	19.6958	19.7051	19.7142	19.7491	19.7573	19.7886	19.7886	19.7886	19.7886	19.7491	19.7406	19.7232	(88)
util rest of house	0.9839	0.9742	0.9525	0.8985	0.7835	0.5900	0.4295	0.4583	0.6959	0.9069	0.9704	0.9862	(89)
MIT 2	18.3642	18.5544	18.8582	19.2753	19.5745	19.7520	19.7814	19.7791	19.7108	19.3265	18.8432	18.3852	(90)

Living area fraction										fLA = Living area / (4) =		0.4054	(91)
MIT	18.8150	19.0037	19.3077	19.7220	20.0345	20.2232	20.2640	20.2598	20.1706	19.7716	19.2824	18.8277	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.6650	18.8537	19.1577	19.5720	19.8845	20.0732	20.1140	20.1098	20.0206	19.6216	19.1324	18.6777	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9795	0.9685	0.9457	0.8939	0.7905	0.6167	0.4679	0.4969	0.7153	0.9032	0.9650	0.9823	(94)
Useful gains	495.9344	544.3474	574.5620	567.8297	502.3784	376.2155	271.0151	276.4605	393.4777	472.4164	471.6865	477.6988	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1133.4471	1098.9708	994.4859	809.8003	605.0587	400.4393	276.7911	283.9309	441.2387	689.9068	906.5521	1114.7141	(97)
Space heating kWh	474.3094	372.7069	312.4234	174.2189	76.3942	0.0000	0.0000	0.0000	0.0000	161.8129	313.1032	473.9394	(98a)
Space heating requirement - total per year (kWh/year)												2358.9083	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	474.3094	372.7069	312.4234	174.2189	76.3942	0.0000	0.0000	0.0000	0.0000	161.8129	313.1032	473.9394	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2358.9083	
Space heating per m2											(98c) / (4) =	43.2748	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	474.3094	372.7069	312.4234	174.2189	76.3942	0.0000	0.0000	0.0000	0.0000	161.8129	313.1032	473.9394	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	564.6541	443.6987	371.9326	207.4034	90.9454	0.0000	0.0000	0.0000	0.0000	192.6344	372.7419	564.2136	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.1276	80.9022	80.4174	79.4255	77.7569	75.0000	75.0000	75.0000	75.0000	79.2267	80.5350	81.1478	(217)
Fuel for water heating, kWh/month	244.6934	215.8933	229.3907	202.4396	198.6514	183.5365	180.3712	189.3309	193.1578	205.9373	217.3100	241.9264	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.1125	12.1238	10.9161	7.9976	6.1776	5.0472	5.6354	7.3251	9.5146	12.4837	14.1003	15.5325	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2808.2241	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2502.6384	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	121.9665	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5547.8290	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2808.2241	5.6000	157.2606	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	2502.6384	5.6000	140.1478	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	121.9665	26.0600	31.7845	(250)
Additional standing charges			99.0000	(251)
Total energy cost			458.1618	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2808.2241	0.2100	589.7271	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2502.6384	0.2100	525.5541	(264)
Space and water heating			1115.2811	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	121.9665	0.1443	17.6035	(268)
Total CO2, kg/year			1148.8366	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2808.2241	1.1300	3173.2933	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2502.6384	1.1300	2827.9814	(278)
Space and water heating			6001.2747	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	121.9665	1.5338	187.0762	(282)
Total Primary energy kWh/year			6362.3229	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 4

Current energy efficiency rating: B 81
Current environmental impact rating: B 84

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: B 81
Potential environmental impact rating: B 84

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£62	£62	£0
Mains gas	£396	£396	£0
Space heating	£286	£286	£0
Water heating	£140	£140	£0
Lighting	£32	£32	£0
Total cost of fuels	£458	£458	£0
Total cost of uses	£458	£458	£0
Delivered energy	102 kWh/m²	102 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m²	21 kg/m²	21 kg/m²	0 kg/m²
Primary energy	117 kWh/m²	117 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100 (1b)	x	2.6700 (2b)	=	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	145.5417	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8874	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8769	0.8597	0.8425	0.7565	0.7393	0.6534	0.6534	0.6362	0.6877	0.7393	0.7737	0.8081	(22b)
Effective ac	0.8845	0.8695	0.8549	0.7862	0.7733	0.7134	0.7134	0.7024	0.7365	0.7733	0.7993	0.8265	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			77.2400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.3444			(33)
Party Ceiling 1			49.9300					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	15.4480	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	40.7924	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	42.4795	41.7624	41.0596	37.7585	37.1408	34.2657	34.2657	33.7332	35.3731	37.1408	38.3903	39.6966	(38)
Heat transfer coeff	83.2719	82.5548	81.8520	78.5509	77.9332	75.0581	75.0581	74.5256	76.1655	77.9332	79.1827	80.4890	(39)
Average = Sum(39)m / 12 =												78.5479	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5276	1.5145	1.5016	1.4410	1.4297	1.3770	1.3770	1.3672	1.3973	1.4297	1.4526	1.4766	(40)
HLP (average)												1.4410	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.8230	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992	(42c)

Average daily hot water use (litres/day)	87.0022 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)										Total = Sum(45)m =		1445.2196	
Distribution loss (46)m = 0.15 x (45)m	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.3248	42.6653	45.9329	42.5826	42.4154	39.4037	40.1026	41.4011	41.3856	44.5431	45.0021	48.2047	(61)
Total heat required for water heating calculated for each month	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(64)
									Total per year (kWh/year) = Sum(64)m =			1967.1833	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)

Heat gains from water heating, kWh/month

	62.0191	54.5553	57.5469	49.9492	47.8604	42.5186	41.6716	43.7988	44.7544	50.5750	54.4783	61.2988 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	17.2656	15.3352	12.4714	9.4416	7.0577	5.9584	6.4383	8.3688	11.2325	14.2623	16.6462	17.7455	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	237.1969	239.6583	233.4557	220.2512	203.5829	187.9170	177.4513	174.9899	181.1925	194.3970	211.0653	226.7311	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	(71)

Water heating gains (Table 5)

	83.3590	81.1835	77.3479	69.3739	64.3285	59.0536	56.0102	58.8693	62.1589	67.9772	75.6643	82.3909	(72)

Total internal gains

	429.0422	427.3976	414.4957	390.2874	366.1898	337.1498	324.1205	326.4487	338.8046	367.8571	394.5965	418.0882	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	36.7938	0.7600	0.8000	0.7700	83.7154	(77)

Solar gains	83.7154	142.5984	195.1093	241.7499	270.7800	268.8219	259.1730	237.5152	211.2621	157.6016	100.2718	71.6430	(83)
Total gains	512.7576	569.9960	609.6050	632.0373	636.9698	605.9717	583.2935	563.9639	550.0667	525.4587	494.8683	489.7312	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.4585	45.8534	46.2471	48.1906	48.5726	50.4332	50.4332	50.7935	49.6999	48.5726	47.8061	47.0303	
alpha	4.0306	4.0569	4.0831	4.2127	4.2382	4.3622	4.3622	4.3862	4.3133	4.2382	4.1871	4.1354	
util living area	0.9886	0.9813	0.9669	0.9318	0.8574	0.7090	0.5446	0.5790	0.7928	0.9375	0.9803	0.9904	(86)
MIT	19.3740	19.5804	19.8958	20.3248	20.6658	20.9042	20.9762	20.9692	20.8317	20.4052	19.8528	19.3904	(87)
Th 2	19.6668	19.6767	19.6863	19.7320	19.7406	19.7810	19.7810	19.7886	19.7654	19.7406	19.7232	19.7051	(88)
util rest of house	0.9848	0.9752	0.9553	0.9067	0.8024	0.6051	0.4044	0.4404	0.7026	0.9093	0.9727	0.9872	(89)
MIT 2	18.2415	18.4521	18.7678	19.2132	19.5245	19.7392	19.7756	19.7807	19.6807	19.3018	18.7574	18.2860	(90)
Living area fraction									fLA = Living area / (4) =			0.4054	(91)
MIT	18.7006	18.9095	19.2251	19.6639	19.9872	20.2115	20.2624	20.2626	20.1473	19.7491	19.2015	18.7338	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.5506	18.7595	19.0751	19.5139	19.8372	20.0615	20.1124	20.1126	19.9973	19.5991	19.0515	18.5838	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9804	0.9694	0.9484	0.9014	0.8073	0.6311	0.4441	0.4794	0.7218	0.9054	0.9673	0.9834	(94)
Useful gains	502.7163	552.5485	578.1305	569.7175	514.2252	382.4410	259.0449	270.3431	397.0268	475.7374	478.6703	481.5801	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1186.6754	1144.1713	1029.2999	833.7298	634.1572	409.9282	263.6317	276.6815	449.1731	701.3303	946.3530	1157.7340	(97)
Space heating kWh	508.8656	397.5705	335.6700	190.0888	89.2295	0.0000	0.0000	0.0000	0.0000	167.8411	336.7315	503.0585	(98a)
Space heating requirement - total per year (kWh/year)												2529.0556	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	508.8656	397.5705	335.6700	190.0888	89.2295	0.0000	0.0000	0.0000	0.0000	167.8411	336.7315	503.0585	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2529.0556	
Space heating per m2										(98c) / (4) =		46.3962	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	508.8656	397.5705	335.6700	190.0888	89.2295	0.0000	0.0000	0.0000	0.0000	167.8411	336.7315	503.0585	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	605.7923	473.2982	399.6072	226.2962	106.2255	0.0000	0.0000	0.0000	0.0000	199.8109	400.8709	598.8792	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)

Water heating

Water heating requirement

	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.2634	81.0320	80.5710	79.6216	78.0624	75.0000	75.0000	75.0000	75.0000	79.3088	80.6886	81.2627 (217)
Fuel for water heating, kWh/month												
	244.2846	215.5473	228.9535	201.9410	197.8738	183.5365	180.3712	189.3309	193.1578	205.7242	216.8961	241.5844 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	15.1125	12.1238	10.9161	7.9976	6.1776	5.0472	5.6354	7.3251	9.5146	12.4837	14.1003	15.5325 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year

Space heating fuel - main system 1	3010.7804 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	75.0000
Water heating fuel used	2499.2012 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
central heating pump	115.0000 (230c)
Total electricity for the above, kWh/year	115.0000 (231)
Electricity for lighting (calculated in Appendix L)	121.9665 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	5746.9480 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3010.7804	3.6400	109.5924	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2499.2012	3.6400	90.9709	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	121.9665	16.4900	20.1123	(250)
Additional standing charges			92.0000	(251)
Total energy cost			331.6391	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.1998	(257)
SAP value		80.5516	
SAP rating (Section 12)		81	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3010.7804	0.2100	632.2639	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2499.2012	0.2100	524.8322	(264)
Space and water heating			1157.0961	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	121.9665	0.1443	17.6035	(268)
Total CO2, kg/year			1190.6516	(272)
CO2 emissions per m2			21.8400	(273)
EI value			83.9667	
EI rating			84	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	54.5100	(1b)	x 2.6700	(2b) =	145.5417	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	54.5100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		145.5417	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1374 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8874 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6877 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8253	0.8081	0.7909	0.7221	0.7049	0.6362	0.6362	0.6362	0.6362	0.7221	0.7393	0.7737	(22b)
Effective ac	0.8406	0.8265	0.8128	0.7607	0.7485	0.7024	0.7024	0.7024	0.7024	0.7607	0.7733	0.7993	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.4000	1.3258	7.1591			(27)
Heatloss Floor 1			54.5100	0.2500	13.6275			(28a)
External Wall 1	18.1500	5.4000	12.7500	0.3000	3.8250			(29a)
External Roof 1	4.5800		4.5800	0.1600	0.7328			(30)
Total net area of external elements Aum(A, m2)			77.2400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.3444			(33)
Party Ceiling 1			49.9300					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							15.4480	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		40.7924	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	40.3710	39.6966	39.0363	36.5374	35.9482	33.7332	33.7332	33.7332	33.7332	36.5374	37.1408	38.3903	(38)
Heat transfer coeff	81.1634	80.4890	79.8287	77.3298	76.7406	74.5256	74.5256	74.5256	74.5256	77.3298	77.9332	79.1827	(39)
Average = Sum(39)m / 12 =												77.3416	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4890	1.4766	1.4645	1.4186	1.4078	1.3672	1.3672	1.3672	1.3672	1.4186	1.4297	1.4526	(40)
HLP (average)												1.4189	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8230 (42)
Hot water usage for mixer showers	61.5318	60.6071	59.2596	56.6814	54.7788	52.6571	51.4511	52.7883	54.2542	56.5324	59.1659	61.2960 (42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses	33.2992	32.0883	30.8775	29.6666	28.4557	27.2448	27.2448	28.4557	29.6666	30.8775	32.0883	33.2992 (42c)
Average daily hot water use (litres/day)												87.0022 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	94.8310	92.6954	90.1371	86.3480	83.2345	79.9019	78.6959	81.2440	83.9208	87.4098	91.2542	94.5952	(44)
Energy conte	150.1891	131.9970	138.5373	118.2061	112.0497	98.2487	95.1758	100.5971	103.4828	118.6143	130.0084	148.1133	(45)
Energy content (annual)										Total = Sum(45)m =		1445.2196	
Distribution loss (46)m = 0.15 x (45)m	22.5284	19.7996	20.7806	17.7309	16.8075	14.7373	14.2764	15.0896	15.5224	17.7921	19.5013	22.2170	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.3248	42.6653	45.9329	42.5826	42.4154	39.4037	40.1026	41.4011	41.3856	44.5431	45.0021	48.2047	(61)
Total heat required for water heating calculated for each month	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180 (64)
Total per year (kWh/year) = Sum(64)m =												1967.1833 (64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)

Heat gains from water heating, kWh/month

	62.0191	54.5553	57.5469	49.9492	47.8604	42.5186	41.6716	43.7988	44.7544	50.5750	54.4783	61.2988 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	109.3793	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	17.2656	15.3352	12.4714	9.4416	7.0577	5.9584	6.4383	8.3688	11.2325	14.2623	16.6462	17.7455 (67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	237.1969	239.6583	233.4557	220.2512	203.5829	187.9170	177.4513	174.9899	181.1925	194.3970	211.0653	226.7311 (68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609	47.7609 (69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000 (70)

Losses e.g. evaporation (negative values) (Table 5)

	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195	-72.9195 (71)

Water heating gains (Table 5)

	83.3590	81.1835	77.3479	69.3739	64.3285	59.0536	56.0102	58.8693	62.1589	67.9772	75.6643	82.3909 (72)

Total internal gains

	429.0422	427.3976	414.4957	390.2874	366.1898	337.1498	324.1205	326.4487	338.8046	367.8571	394.5965	418.0882 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	5.4000	33.9635	0.7600	0.8000	0.7700	77.2758	(77)

Solar gains	77.2758	134.6762	193.0769	244.9732	269.3697	272.8542	255.0591	229.9510	211.2621	155.2137	94.1947	68.2314 (83)
Total gains	506.3180	562.0739	607.5726	635.2606	635.5595	610.0040	579.1796	556.3997	550.0667	523.0708	488.7912	486.3196 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	46.6395	47.0303	47.4192	48.9516	49.3274	50.7935	50.7935	50.7935	50.7935	48.9516	48.5726	47.8061	
alpha	4.1093	4.1354	4.1613	4.2634	4.2885	4.3862	4.3862	4.3862	4.3862	4.2634	4.2382	4.1871	
util living area	0.9880	0.9806	0.9647	0.9256	0.8430	0.6953	0.5662	0.5961	0.7859	0.9358	0.9788	0.9897	(86)
MIT	19.4761	19.6626	19.9669	20.3772	20.7091	20.9142	20.9718	20.9648	20.8450	20.4244	19.9266	19.4767	(87)
Th 2	19.6958	19.7051	19.7142	19.7491	19.7573	19.7886	19.7886	19.7886	19.7886	19.7491	19.7406	19.7232	(88)
util rest of house	0.9839	0.9742	0.9525	0.8985	0.7835	0.5900	0.4295	0.4583	0.6959	0.9069	0.9704	0.9862	(89)
MIT 2	18.3642	18.5544	18.8582	19.2753	19.5745	19.7520	19.7814	19.7791	19.7108	19.3265	18.8432	18.3852	(90)
Living area fraction									fLA = Living area / (4) =			0.4054	(91)
MIT	18.8150	19.0037	19.3077	19.7220	20.0345	20.2232	20.2640	20.2598	20.1706	19.7716	19.2824	18.8277	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.6650	18.8537	19.1577	19.5720	19.8845	20.0732	20.1140	20.1098	20.0206	19.6216	19.1324	18.6777	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9795	0.9685	0.9457	0.8939	0.7905	0.6167	0.4679	0.4969	0.7153	0.9032	0.9650	0.9823	(94)
Useful gains	495.9344	544.3474	574.5620	567.8297	502.3784	376.2155	271.0151	276.4605	393.4777	472.4164	471.6865	477.6988	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1133.4471	1098.9708	994.4859	809.8003	605.0587	400.4393	276.7911	283.9309	441.2387	689.9068	906.5521	1114.7141	(97)
Space heating kWh	474.3094	372.7069	312.4234	174.2189	76.3942	0.0000	0.0000	0.0000	0.0000	161.8129	313.1032	473.9394	(98a)
Space heating requirement - total per year (kWh/year)												2358.9083	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	474.3094	372.7069	312.4234	174.2189	76.3942	0.0000	0.0000	0.0000	0.0000	161.8129	313.1032	473.9394	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2358.9083	
Space heating per m2											(98c) / (4) =	43.2748	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
Fraction of space heat from main system(s)	1.0000 (202)
Efficiency of main space heating system 1 (in %)	84.0000 (206)
Efficiency of main space heating system 2 (in %)	0.0000 (207)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	474.3094	372.7069	312.4234	174.2189	76.3942	0.0000	0.0000	0.0000	0.0000	161.8129	313.1032	473.9394	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	564.6541	443.6987	371.9326	207.4034	90.9454	0.0000	0.0000	0.0000	0.0000	192.6344	372.7419	564.2136	(211)
Space heating efficiency (main heating system 2)													

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating												
Water heating requirement												
	198.5139	174.6623	184.4701	160.7887	154.4651	137.6524	135.2784	141.9981	144.8684	163.1574	175.0105	196.3180 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.1276	80.9022	80.4174	79.4255	77.7569	75.0000	75.0000	75.0000	75.0000	79.2267	80.5350	81.1478 (217)
Fuel for water heating, kWh/month												
	244.6934	215.8933	229.3907	202.4396	198.6514	183.5365	180.3712	189.3309	193.1578	205.9373	217.3100	241.9264 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	15.1125	12.1238	10.9161	7.9976	6.1776	5.0472	5.6354	7.3251	9.5146	12.4837	14.1003	15.5325 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2808.2241	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2502.6384	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	121.9665	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5547.8290	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2808.2241	5.6000	157.2606	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2502.6384	5.6000	140.1478	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	121.9665	26.0600	31.7845	(250)
Additional standing charges			99.0000	(251)
Total energy cost			458.1618	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2808.2241	0.2100	589.7271	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2502.6384	0.2100	525.5541	(264)
Space and water heating			1115.2811	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	121.9665	0.1443	17.6035	(268)
Total CO2, kg/year			1148.8366	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2808.2241	1.1300	3173.2933	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2502.6384	1.1300	2827.9814	(278)
Space and water heating			6001.2747	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	121.9665	1.5338	187.0762	(282)
Total Primary energy kWh/year			6362.3229	(286)

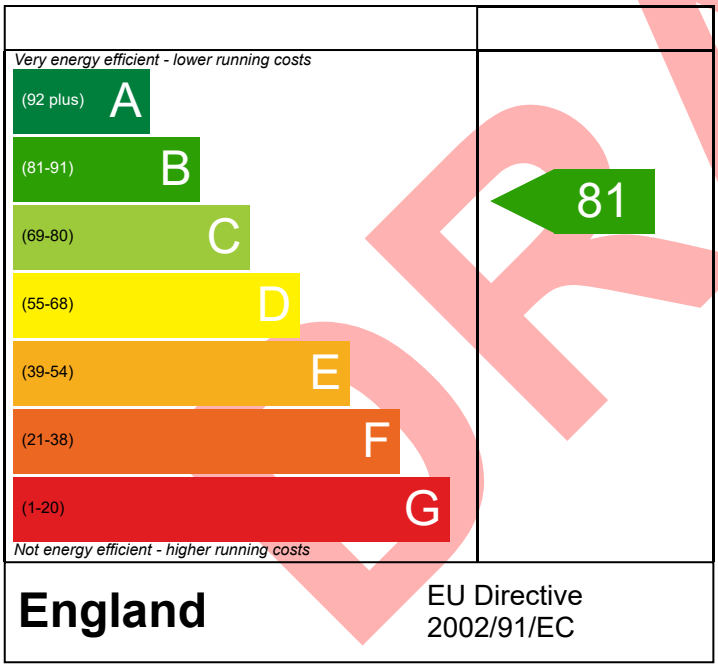
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	54.51 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

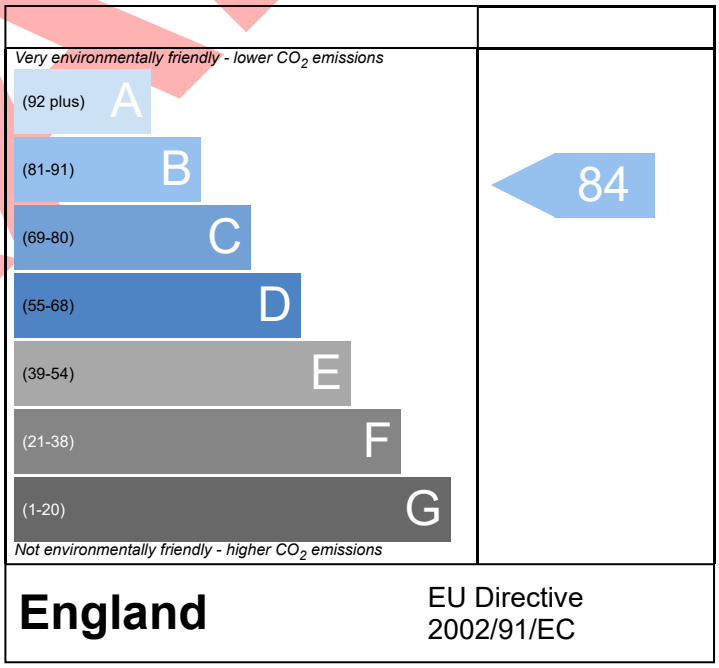
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

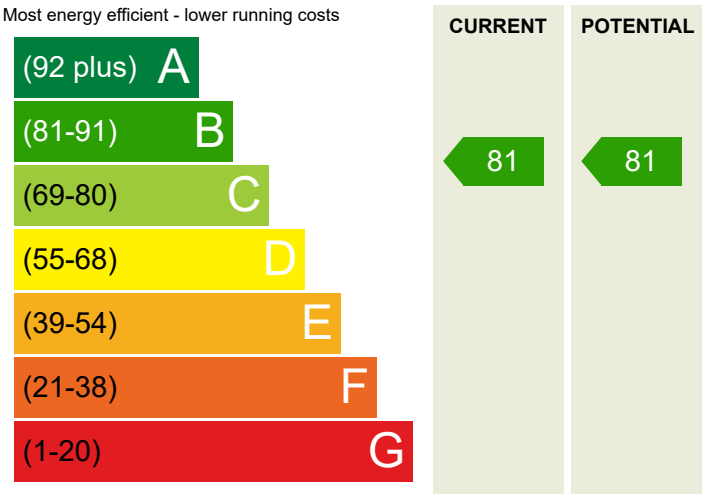
Energy Report

Dwelling Address	
Reference	Apt. 4-Apt. 4
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	55

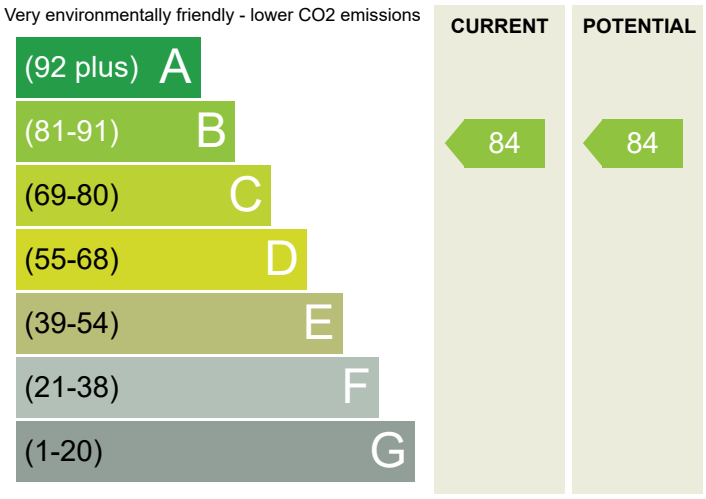
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

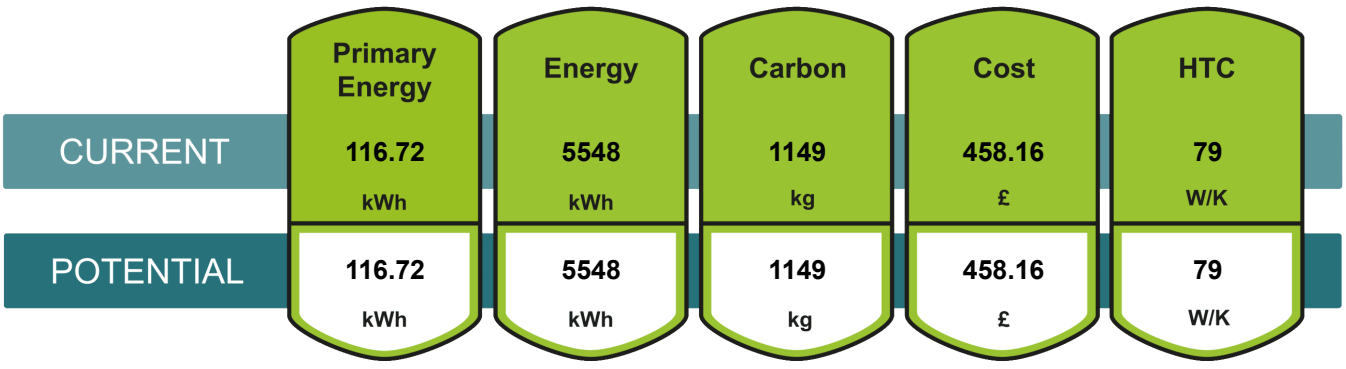
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£32	£32	
Heating	£286	£286	
Hot Water	£140	£140	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£458	£458	

Estimated energy use and potential savings

Space Heating
2808
kWh per year

Water Heating
2503
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 4	Issued on Date	01/10/2024
Assessment Reference	Apt. 4	Prop Type Ref	Detached Flat
Property			

SAP Rating	81 B	DER	22.36	TER	
Environmental	84 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.15	DFEE	54.11	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	123.62	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	18.15	m²	

Comments

External Roofs

Dwelling Sign Off Report

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	4.58	m²	

Comments

Heat Loss Floors

Description	Heatloss Floor 1		
Type	Ground Floor - Solid		
Construction	Other		
U-value	0.25	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	54.51	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SE1	New Glazing	External Wall 1	South East	5.40

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System No

Comments

Lighting

No Fixed Lighting No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1 SAP table

Fuel Type Mains gas

Winter Efficiency 84.00 %

Summer Efficiency 75.00 %

Model Name

Manufacturer	
System Type	
Flue Type	None or Unknown
Fan Assisted Flue	No
Heat Emitter	Radiators
Flow Temperature	Unknown
Flow Temperature Value	

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 5	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 5	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	26.38	**TER**	
Environmental	80 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.57	**DFEE**	74.00	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	144.83	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	24.33 m	63.10 m²	2.67 m

8.0 Living Area	21.91	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	60.39	50.00	0.00	None	10.39	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	5.16	5.16	None	0.00	Enter Gross Area	0.00

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Other	0.00	57.94

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Other	0.25	None	0.00	0.00	63.10

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40

Summary for Input Data

Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SE1	New Glazing	External Wall 1	South East	4.04	0
W SW1	New Glazing	External Wall 1	South West	5.90	0
W NW1	New Glazing	External Wall 1	North West	0.45	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	

Summary for Input Data

elmhurst energy

25.0 Main Heating 2	None
26.0 Heat Networks	None

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 5	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 5	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	26.38	**TER**	
Environmental	80 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.57	**DFEE**	74.00	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	144.83	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		168.4770	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0245	1.0044	0.9844	0.8839	0.8638	0.7634	0.7634	0.7433	0.8036	0.8638	0.9040	0.9442	(22b)
Effective ac	1.0245	1.0044	0.9845	0.8907	0.8731	0.7914	0.7914	0.7762	0.8229	0.8731	0.9086	0.9457	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			128.6500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.3752			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	25.7300	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	71.1052	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	56.9615	55.8446	54.7345	49.5179	48.5419	43.9983	43.9983	43.1570	45.7484	48.5419	50.5163	52.5806	(38)
Heat transfer coeff	128.0667	126.9499	125.8398	120.6231	119.6471	115.1036	115.1036	114.2622	116.8537	119.6471	121.6216	123.6858	(39)
Average = Sum(39)m / 12 =												120.6170	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0296	2.0119	1.9943	1.9116	1.8962	1.8241	1.8241	1.8108	1.8519	1.8962	1.9274	1.9602	(40)
HLP (average)												1.9115	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0678	(42)
Hot water usage for mixer showers													
	66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)
Average daily hot water use (litres/day)												93.5492	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)										Total = Sum(45)m =		1553.9731	
Distribution loss (46)m = 0.15 x (45)m													
	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.8759	49.3893	45.7869	45.6072	42.3688	43.1203	44.5165	44.4999	47.8950	48.3885	50.9589	(61)
Total heat required for water heating calculated for each month													
	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
										Total per year (kWh/year) = Sum(64)m =		2113.3393	(64)
12Total per year (kWh/year)												2113	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.4355	58.6606	61.8773	53.7079	51.4619	45.7181	44.8074	47.0947	48.1222	54.3808	58.5778	65.6933	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	92.4673	102.3745	92.4673	95.5495	92.4673	95.5495	92.4673	92.4673	95.5495	92.4673	95.5495	92.4673	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	180.6921	182.5671	177.8421	167.7832	155.0856	143.1516	135.1790	133.3040	138.0290	148.0879	160.7855	172.7194	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)													
	89.2950	87.2926	83.1684	74.5943	69.1692	63.4974	60.2250	63.2993	66.8364	73.0925	81.3581	88.2975	(72)
Total internal gains													
	423.4712	433.2510	414.4946	398.9438	377.7389	356.2154	341.8881	343.0874	354.4318	374.6646	398.7100	414.5010	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	36.7938	0.7600	0.8000	0.7700	62.6316	(77)
Southwest	5.9000	36.7938	0.7600	0.8000	0.7700	91.4669	(79)
Northwest	0.4500	11.2829	0.7600	0.8000	0.7700	2.1393	(81)

Solar gains	156.2377	266.8413	366.9913	457.8837	515.7555	513.2960	494.3435	450.9744	398.4388	295.4253	187.2662	133.6232	(83)
Total gains	579.7089	700.0923	781.4859	856.8275	893.4944	869.5114	836.2317	794.0618	752.8706	670.0899	585.9762	548.1243	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.2161	34.5171	34.8216	36.3276	36.6239	38.0696	38.0696	38.3499	37.4994	36.6239	36.0293	35.4280	
alpha	3.2811	3.3011	3.3214	3.4218	3.4416	3.5380	3.5380	3.5567	3.5000	3.4416	3.4020	3.3619	
util living area													
	0.9899	0.9807	0.9649	0.9263	0.8513	0.7111	0.5605	0.6011	0.8036	0.9414	0.9821	0.9916	(86)
MIT	18.7086	19.0070	19.4236	20.0066	20.4734	20.8209	20.9429	20.9267	20.6969	20.0825	19.3406	18.7285	(87)
Th 2	19.3137	19.3254	19.3371	19.3929	19.4035	19.4531	19.4531	19.4624	19.4339	19.4035	19.3821	19.3600	(88)
util rest of house													
	0.9863	0.9737	0.9516	0.8966	0.7867	0.5870	0.3839	0.4270	0.6994	0.9114	0.9744	0.9886	(89)
MIT 2	17.3354	17.6374	18.0536	18.6507	19.0763	19.3802	19.4419	19.4460	19.2882	18.7415	18.0089	17.3864	(90)
Living area fraction										fLA = Living area / (4) =		0.3472	(91)
MIT	17.8123	18.1130	18.5293	19.1215	19.5614	19.8804	19.9631	19.9601	19.7773	19.2071	18.4713	17.8524	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.6623	17.9630	18.3793	18.9715	19.4114	19.7304	19.8131	19.8101	19.6273	19.0571	18.3213	17.7024	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9809	0.9656	0.9411	0.8865	0.7871	0.6121	0.4282	0.4700	0.7148	0.9026	0.9670	0.9840	(94)
Useful gains	568.6081	676.0270	735.4386	759.6065	703.2958	532.2641	358.0431	373.2309	538.1632	604.8335	566.6670	539.3573	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1711.2609	1658.3424	1494.8862	1214.8558	922.6496	590.5309	369.8390	389.6468	645.8880	1011.8723	1364.7542	1670.0550	(97)
Space heating kWh													
	850.1337	660.1160	565.0290	327.7795	163.1992	0.0000	0.0000	0.0000	0.0000	302.8369	574.6228	841.2391	(98a)
Space heating requirement - total per year (kWh/year)												4284.9561	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	850.1337	660.1160	565.0290	327.7795	163.1992	0.0000	0.0000	0.0000	0.0000	302.8369	574.6228	841.2391	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4284.9561	
Space heating per m2											(98c) / (4) =	67.9074	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	850.1337	660.1160	565.0290	327.7795	163.1992	0.0000	0.0000	0.0000	0.0000	302.8369	574.6228	841.2391	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	1012.0639	785.8524	672.6536	390.2137	194.2847	0.0000	0.0000	0.0000	0.0000	360.5201	684.0748	1001.4751	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
Efficiency of water heater												75.0000	(216)
(217)m	82.0319	81.8252	81.4601	80.6577	79.2059	75.0000	75.0000	75.0000	75.0000	80.4584	81.5848	82.0319	(217)
Fuel for water heating, kWh/month													
	258.9846	229.5207	243.4954	214.3479	209.6921	197.3476	193.9442	203.5781	207.6931	218.0444	230.6559	256.2634	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.4238	12.3736	11.1410	8.1624	6.3049	5.1511	5.7515	7.4760	9.7106	12.7409	14.3908	15.8525	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5101.1382	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2663.5675	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	124.4792	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	8004.1849	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5101.1382	0.2100	1071.2390	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2663.5675	0.2100	559.3492	(264)
Space and water heating			1630.5882	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	124.4792	0.1443	17.9662	(268)

Total CO2, kg/year	1664.5063	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)	26.3800	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	5101.1382	1.1300	5764.2862	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2663.5675	1.1300	3009.8313	(278)
Space and water heating			8774.1175	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	124.4792	1.5338	190.9303	(282)
Total Primary energy kWh/year			9139.0198	(286)
Dwelling Primary energy Rate (DPER)			144.8300	(287)

Full SAP Calculation Printout

Property Reference	Apt. 5	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 5	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	26.38	**TER**	
Environmental	80 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.57	**DFEE**	74.00	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	144.83	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		168.4770	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0245	1.0044	0.9844	0.8839	0.8638	0.7634	0.7634	0.7433	0.8036	0.8638	0.9040	0.9442	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	1.0245	1.0044	0.9845	0.8907	0.8731	0.7914	0.7914	0.7762	0.8229	0.8731	0.9086	0.9457	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			128.6500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.3752			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		25.7300	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	71.1052	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	56.9615	55.8446	54.7345	49.5179	48.5419	43.9983	43.9983	43.1570	45.7484	48.5419	50.5163	52.5806	(38)
Heat transfer coeff	128.0667	126.9499	125.8398	120.6231	119.6471	115.1036	115.1036	114.2622	116.8537	119.6471	121.6216	123.6858	(39)

Average = Sum(39)m / 12 = 120.6170

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0296	2.0119	1.9943	1.9116	1.8962	1.8241	1.8241	1.8108	1.8519	1.8962	1.9274	1.9602	(40)
HLP (average)												1.9115	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.0678 (42)

Hot water usage for mixer showers

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)

Hot water usage for baths

25.4477	25.0698	24.5376	23.5563	22.8215	22.0067	21.5666	22.0951	22.6705	23.5424	24.5439	25.3617	(42b)

Hot water usage for other uses

35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)

Average daily hot water use (litres/day) 56.1452 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	61.2539	59.5740	57.7397	55.4564	53.4195	51.3027	50.8626	52.6932	54.5706	56.7445	59.0481	61.1679	(44)
Energy conte	97.0113	84.8325	88.7438	75.9170	71.9130	63.0827	61.5139	65.2451	67.2910	77.0018	84.1248	95.7742	(45)

Energy content (annual) Total = Sum(45)m = 932.4510

Distribution loss (46)m = 0.15 x (45)m

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)

Water storage loss:

Total storage loss

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)

If cylinder contains dedicated solar storage

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)

Total heat required for water heating calculated for each month

82.4596	72.1076	75.4322	64.5294	61.1260	53.6203	52.2869	55.4584	57.1974	65.4515	71.5061	81.4080	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

82.4596	72.1076	75.4322	64.5294	61.1260	53.6203	52.2869	55.4584	57.1974	65.4515	71.5061	81.4080	(64)

Total per year (kWh/year) = Sum(64)m = 792.5834 (64)

12Total per year (kWh/year) 793 (64)

Electric shower(s)

47.1608	42.0207	45.8849	43.7874	44.6091	42.5527	43.9712	44.6091	43.7874	45.8849	45.0221	47.1608	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 536.4512 (64a)

Heat gains from water heating, kWh/month

32.4051	28.5321	30.3293	27.0792	26.4338	24.0433	24.0645	25.0169	25.2462	27.8341	29.1320	32.1422	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	92.4673	102.3745	92.4673	95.5495	92.4673	95.5495	92.4673	92.4673	95.5495	92.4673	95.5495	92.4673	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	180.6921	182.5671	177.8421	167.7832	155.0856	143.1516	135.1790	133.3040	138.0290	148.0879	160.7855	172.7194	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)													
	43.5552	42.4584	40.7652	37.6100	35.5293	33.3934	32.3448	33.6248	35.0642	37.4114	40.4612	43.2019	(72)
Total internal gains													
	370.7314	381.4169	365.0914	354.9596	337.0990	326.1114	314.0079	313.4129	322.6595	331.9835	350.8130	362.4055	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	36.7938	0.7600	0.8000	0.7700	62.6316	(77)
Southwest	5.9000	36.7938	0.7600	0.8000	0.7700	91.4669	(79)
Northwest	0.4500	11.2829	0.7600	0.8000	0.7700	2.1393	(81)

Solar gains	156.2377	266.8413	366.9913	457.8837	515.7555	513.2960	494.3435	450.9744	398.4388	295.4253	187.2662	133.6232	(83)
Total gains	526.9692	648.2581	732.0827	812.8432	852.8545	839.4074	808.3514	764.3873	721.0983	627.4088	538.0792	496.0287	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.2161	34.5171	34.8216	36.3276	36.6239	38.0696	38.0696	38.3499	37.4994	36.6239	36.0293	35.4280	
alpha	3.2811	3.3011	3.3214	3.4218	3.4416	3.5380	3.5380	3.5567	3.5000	3.4416	3.4020	3.3619	
util living area	0.9924	0.9845	0.9706	0.9354	0.8651	0.7262	0.5757	0.6184	0.8190	0.9507	0.9860	0.9938	(86)
MIT	18.6341	18.9360	19.3596	19.9568	20.4393	20.8077	20.9378	20.9197	20.6751	20.0311	19.2738	18.6536	(87)
Th 2	19.3137	19.3254	19.3371	19.3929	19.4035	19.4531	19.4531	19.4624	19.4339	19.4035	19.3821	19.3600	(88)
util rest of house	0.9896	0.9788	0.9592	0.9085	0.8039	0.6029	0.3961	0.4419	0.7180	0.9245	0.9799	0.9916	(89)
MIT 2	17.2618	17.5681	17.9925	18.6063	19.0504	19.3737	19.4408	19.4441	19.2750	18.6956	17.9439	17.3123	(90)

Living area fraction fLA = Living area / (4) = 0.3472 (91)

MIT	17.7383	18.0431	18.4672	19.0752	19.5327	19.8716	19.9606	19.9564	19.7611	19.1593	18.4057	17.7780	(92)

Temperature adjustment												0.0000	
adjusted MIT	17.7383	18.0431	18.4672	19.0752	19.5327	19.8716	19.9606	19.9564	19.7611	19.1593	18.4057	17.7780	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9856	0.9726	0.9510	0.9017	0.8099	0.6404	0.4595	0.5037	0.7431	0.9191	0.9746	0.9883	(94)
Useful gains	519.3955	630.4651	696.2195	732.9025	690.7163	537.5687	371.4029	385.0513	535.8591	576.6366	524.3985	490.2078	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1721.0034	1668.5111	1505.9485	1227.3687	937.1561	606.7831	386.8141	406.3670	661.5249	1024.0967	1375.0142	1679.4109	(97)
Space heating kWh													
	893.9963	697.5669	602.4383	356.0157	183.3512	0.0000	0.0000	0.0000	0.0000	332.9103	612.4433	884.7671	(98a)
Space heating requirement - total per year (kWh/year)												4563.4891	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	893.9963	697.5669	602.4383	356.0157	183.3512	0.0000	0.0000	0.0000	0.0000	332.9103	612.4433	884.7671	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4563.4891	
Space heating per m2											(98c) / (4) =	72.3215	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	1081.9736	851.7664	868.3925	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7246	0.8053	0.7776	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	783.9794	685.8933	675.2616	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	945.9298	911.4810	861.8925	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	116.6042	167.8373	138.8534	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	29.1511	41.9593	34.7134	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												105.8237	(107)
Energy for space heating												72.3215	(99)
Energy for space cooling												1.6771	(108)
Total												73.9986	(109)
Fabric Energy Efficiency (DFEE)												74.0	(109)

Full SAP Calculation Printout

Property Reference	Apt. 5	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 5	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	26.38	**TER**	
Environmental	80 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.57	**DFEE**	74.00	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	144.83	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		168.4770	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0245	1.0044	0.9844	0.8839	0.8638	0.7634	0.7634	0.7433	0.8036	0.8638	0.9040	0.9442	(22b)
Effective ac	1.0245	1.0044	0.9845	0.8907	0.8731	0.7914	0.7914	0.7762	0.8229	0.8731	0.9086	0.9457	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			128.6500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.3752			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	25.7300	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	71.1052	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	56.9615	55.8446	54.7345	49.5179	48.5419	43.9983	43.9983	43.1570	45.7484	48.5419	50.5163	52.5806	(38)
Heat transfer coeff	128.0667	126.9499	125.8398	120.6231	119.6471	115.1036	115.1036	114.2622	116.8537	119.6471	121.6216	123.6858	(39)
Average = Sum(39)m / 12 =												120.6170	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0296	2.0119	1.9943	1.9116	1.8962	1.8241	1.8241	1.8108	1.8519	1.8962	1.9274	1.9602	(40)
HLP (average)												1.9115	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0678	(42)
Hot water usage for mixer showers													
	66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)
Average daily hot water use (litres/day)												93.5492	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)										Total = Sum(45)m =		1553.9731	
Distribution loss (46)m = 0.15 x (45)m													
	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.8759	49.3893	45.7869	45.6072	42.3688	43.1203	44.5165	44.4999	47.8950	48.3885	50.9589	(61)
Total heat required for water heating calculated for each month													
	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
										Total per year (kWh/year) = Sum(64)m =		2113.3393	(64)
12Total per year (kWh/year)												2113	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.4355	58.6606	61.8773	53.7079	51.4619	45.7181	44.8074	47.0947	48.1222	54.3808	58.5778	65.6933	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	103.3895	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	92.4673	102.3745	92.4673	95.5495	92.4673	95.5495	92.4673	92.4673	95.5495	92.4673	95.5495	92.4673	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	180.6921	182.5671	177.8421	167.7832	155.0856	143.1516	135.1790	133.3040	138.0290	148.0879	160.7855	172.7194	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	33.3390	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)													
	89.2950	87.2926	83.1684	74.5943	69.1692	63.4974	60.2250	63.2993	66.8364	73.0925	81.3581	88.2975	(72)
Total internal gains													
	423.4712	433.2510	414.4946	398.9438	377.7389	356.2154	341.8881	343.0874	354.4318	374.6646	398.7100	414.5010	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	36.7938	0.7600	0.8000	0.7700	62.6316	(77)
Southwest	5.9000	36.7938	0.7600	0.8000	0.7700	91.4669	(79)
Northwest	0.4500	11.2829	0.7600	0.8000	0.7700	2.1393	(81)

Solar gains	156.2377	266.8413	366.9913	457.8837	515.7555	513.2960	494.3435	450.9744	398.4388	295.4253	187.2662	133.6232	(83)
Total gains	579.7089	700.0923	781.4859	856.8275	893.4944	869.5114	836.2317	794.0618	752.8706	670.0899	585.9762	548.1243	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.2161	34.5171	34.8216	36.3276	36.6239	38.0696	38.0696	38.3499	37.4994	36.6239	36.0293	35.4280	
alpha	3.2811	3.3011	3.3214	3.4218	3.4416	3.5380	3.5380	3.5567	3.5000	3.4416	3.4020	3.3619	
util living area													
	0.9899	0.9807	0.9649	0.9263	0.8513	0.7111	0.5605	0.6011	0.8036	0.9414	0.9821	0.9916	(86)
MIT	18.7086	19.0070	19.4236	20.0066	20.4734	20.8209	20.9429	20.9267	20.6969	20.0825	19.3406	18.7285	(87)
Th 2	19.3137	19.3254	19.3371	19.3929	19.4035	19.4531	19.4531	19.4624	19.4339	19.4035	19.3821	19.3600	(88)
util rest of house													
	0.9863	0.9737	0.9516	0.8966	0.7867	0.5870	0.3839	0.4270	0.6994	0.9114	0.9744	0.9886	(89)
MIT 2	17.3354	17.6374	18.0536	18.6507	19.0763	19.3802	19.4419	19.4460	19.2882	18.7415	18.0089	17.3864	(90)
Living area fraction										fLA = Living area / (4) =		0.3472	(91)
MIT	17.8123	18.1130	18.5293	19.1215	19.5614	19.8804	19.9631	19.9601	19.7773	19.2071	18.4713	17.8524	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.6623	17.9630	18.3793	18.9715	19.4114	19.7304	19.8131	19.8101	19.6273	19.0571	18.3213	17.7024	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9809	0.9656	0.9411	0.8865	0.7871	0.6121	0.4282	0.4700	0.7148	0.9026	0.9670	0.9840	(94)
Useful gains	568.6081	676.0270	735.4386	759.6065	703.2958	532.2641	358.0431	373.2309	538.1632	604.8335	566.6670	539.3573	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1711.2609	1658.3424	1494.8862	1214.8558	922.6496	590.5309	369.8390	389.6468	645.8880	1011.8723	1364.7542	1670.0550	(97)
Space heating kWh													
	850.1337	660.1160	565.0290	327.7795	163.1992	0.0000	0.0000	0.0000	0.0000	302.8369	574.6228	841.2391	(98a)
Space heating requirement - total per year (kWh/year)												4284.9561	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	850.1337	660.1160	565.0290	327.7795	163.1992	0.0000	0.0000	0.0000	0.0000	302.8369	574.6228	841.2391	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4284.9561	
Space heating per m2											(98c) / (4) =	67.9074	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	850.1337	660.1160	565.0290	327.7795	163.1992	0.0000	0.0000	0.0000	0.0000	302.8369	574.6228	841.2391	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	1012.0639	785.8524	672.6536	390.2137	194.2847	0.0000	0.0000	0.0000	0.0000	360.5201	684.0748	1001.4751	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
Efficiency of water heater												75.0000	(216)
(217)m	82.0319	81.8252	81.4601	80.6577	79.2059	75.0000	75.0000	75.0000	75.0000	80.4584	81.5848	82.0319	(217)
Fuel for water heating, kWh/month													
	258.9846	229.5207	243.4954	214.3479	209.6921	197.3476	193.9442	203.5781	207.6931	218.0444	230.6559	256.2634	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.4238	12.3736	11.1410	8.1624	6.3049	5.1511	5.7515	7.4760	9.7106	12.7409	14.3908	15.8525	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5101.1382	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2663.5675	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	124.4792	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	8004.1849	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5101.1382	0.2100	1071.2390	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2663.5675	0.2100	559.3492	(264)
Space and water heating			1630.5882	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	124.4792	0.1443	17.9662	(268)

Total CO2, kg/year	1664.5063	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)	26.3800	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	5101.1382	1.1300	5764.2862	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2663.5675	1.1300	3009.8313	(278)
Space and water heating			8774.1175	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	124.4792	1.5338	190.9303	(282)
Total Primary energy kWh/year			9139.0198	(286)
Dwelling Primary energy Rate (DPER)			144.8300	(287)

Full SAP Calculation Printout

Property Reference	Apt. 5	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 5	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	26.38	**TER**	
Environmental	80 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.57	**DFEE**	74.00	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	144.83	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		63.1000 (1b)	x	2.6700 (2b)	=	168.4770	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	168.4770	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0245	1.0044	0.9844	0.8839	0.8638	0.7634	0.7634	0.7433	0.8036	0.8638	0.9040	0.9442	(22b)
Effective ac	1.0245	1.0044	0.9845	0.8907	0.8731	0.7914	0.7914	0.7762	0.8229	0.8731	0.9086	0.9457	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			128.6500					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	45.3752			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	25.7300	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	71.1052	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	56.9615	55.8446	54.7345	49.5179	48.5419	43.9983	43.9983	43.1570	45.7484	48.5419	50.5163	52.5806	(38)
Heat transfer coeff	128.0667	126.9499	125.8398	120.6231	119.6471	115.1036	115.1036	114.2622	116.8537	119.6471	121.6216	123.6858	(39)
Average = Sum(39)m / 12 =												120.6170	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0296	2.0119	1.9943	1.9116	1.8962	1.8241	1.8241	1.8108	1.8519	1.8962	1.9274	1.9602	(40)
HLP (average)												1.9115	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0678	(42)
Hot water usage for mixer showers													
	66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)
Average daily hot water use (litres/day)												93.5492	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)										Total = Sum(45)m =		1553.9731	
Distribution loss (46)m = 0.15 x (45)m													
	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.8759	49.3893	45.7869	45.6072	42.3688	43.1203	44.5165	44.4999	47.8950	48.3885	50.9589	(61)
Total heat required for water heating calculated for each month													
	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
										Total per year (kWh/year) = Sum(64)m =		2113.3393	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.4355	58.6606	61.8773	53.7079	51.4619	45.7181	44.8074	47.0947	48.1222	54.3808	58.5778	65.6933	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.6213	15.6511	12.7283	9.6362	7.2031	6.0812	6.5709	8.5412	11.4639	14.5561	16.9891	18.1111	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	269.6896	272.4882	265.4360	250.4226	231.4710	213.6591	201.7597	198.9612	206.0134	221.0267	239.9784	257.7902	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)													
	89.2950	87.2926	83.1684	74.5943	69.1692	63.4974	60.2250	63.2993	66.8364	73.0925	81.3581	88.2975	(72)
Total internal gains													
	474.4363	473.2622	459.1630	432.4834	405.6737	374.0681	359.3860	361.6320	375.1441	406.5057	436.1559	462.0291	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	36.7938	0.7600	0.8000	0.7700	62.6316	(77)
Southwest	5.9000	36.7938	0.7600	0.8000	0.7700	91.4669	(79)
Northwest	0.4500	11.2829	0.7600	0.8000	0.7700	2.1393	(81)

Solar gains	156.2377	266.8413	366.9913	457.8837	515.7555	513.2960	494.3435	450.9744	398.4388	295.4253	187.2662	133.6232	(83)
Total gains	630.6740	740.1035	826.1543	890.3671	921.4292	887.3641	853.7295	812.6063	773.5829	701.9310	623.4221	595.6523	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.2161	34.5171	34.8216	36.3276	36.6239	38.0696	38.0696	38.3499	37.4994	36.6239	36.0293	35.4280	
alpha	3.2811	3.3011	3.3214	3.4218	3.4416	3.5380	3.5380	3.5567	3.5000	3.4416	3.4020	3.3619	
util living area													
	0.9871	0.9774	0.9593	0.9190	0.8417	0.7022	0.5513	0.5906	0.7936	0.9340	0.9785	0.9893	(86)
MIT	18.7799	19.0610	19.4803	20.0433	20.4958	20.8282	20.9458	20.9307	20.7102	20.1196	19.3921	18.7962	(87)
Th 2	19.3137	19.3254	19.3371	19.3929	19.4035	19.4531	19.4531	19.4624	19.4339	19.4035	19.3821	19.3600	(88)
util rest of house													
	0.9825	0.9694	0.9442	0.8872	0.7750	0.5778	0.3765	0.4181	0.6875	0.9012	0.9695	0.9855	(89)
MIT 2	17.4056	17.6900	18.1072	18.6831	19.0930	19.3837	19.4426	19.4470	19.2962	18.7742	18.0587	17.4531	(90)
Living area fraction										fLA = Living area / (4) =		0.3472	(91)
MIT	17.8828	18.1660	18.5840	19.1554	19.5800	19.8853	19.9645	19.9622	19.7872	19.2413	18.5217	17.9195	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.7328	18.0160	18.4340	19.0054	19.4300	19.7353	19.8145	19.8122	19.6372	19.0913	18.3717	17.7695	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9761	0.9606	0.9331	0.8774	0.7763	0.6034	0.4204	0.4608	0.7039	0.8926	0.9614	0.9800	(94)
Useful gains	615.6236	710.9291	770.9165	781.2255	715.3058	535.3999	358.8709	374.4573	544.4938	626.5715	599.3835	583.7150	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1720.2953	1665.0788	1501.7656	1218.9461	924.8770	591.0907	370.0060	389.8851	647.0376	1015.9653	1370.8800	1678.3528	(97)
Space heating kWh	821.8758	641.1886	543.7518	315.1588	155.9210	0.0000	0.0000	0.0000	0.0000	289.7090	555.4775	814.4105	(98a)
Space heating requirement - total per year (kWh/year)												4137.4930	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	821.8758	641.1886	543.7518	315.1588	155.9210	0.0000	0.0000	0.0000	0.0000	289.7090	555.4775	814.4105	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4137.4930	
Space heating per m2											(98c) / (4) =	65.5704	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	821.8758	641.1886	543.7518	315.1588	155.9210	0.0000	0.0000	0.0000	0.0000	289.7090	555.4775	814.4105	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	978.4236	763.3198	647.3235	375.1891	185.6202	0.0000	0.0000	0.0000	0.0000	344.8917	661.2827	969.5363	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.9794	81.7768	81.3895	80.5748	79.1039	75.0000	75.0000	75.0000	75.0000	80.3628	81.5245	81.9816	(217)
Fuel for water heating, kWh/month	259.1504	229.6563	243.7065	214.5684	209.9626	197.3476	193.9442	203.5781	207.6931	218.3039	230.8266	256.4207	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.4238	12.3736	11.1410	8.1624	6.3049	5.1511	5.7515	7.4760	9.7106	12.7409	14.3908	15.8525	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4925.5869	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2665.1585	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	124.4792	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7830.2246	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4925.5869	3.6400	179.2914	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2665.1585	3.6400	97.0118	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	124.4792	16.4900	20.5266	(250)
Additional standing charges			92.0000	(251)

Total energy cost 407.7932 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.3581 (257)
SAP value		77.9860
SAP rating (Section 12)		78 (258)
SAP band		C

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4925.5869	0.2100	1034.3732	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2665.1585	0.2100	559.6833	(264)
Space and water heating			1594.0565	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	124.4792	0.1443	17.9662	(268)
Total CO2, kg/year			1627.9746	(272)
CO2 emissions per m2			25.8000	(273)
EI value			79.8197	
EI rating			80	(274)
EI band			C	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	168.4770	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9643	0.9442	0.9241	0.8437	0.8236	0.7433	0.7433	0.7433	0.7433	0.8437	0.8638	0.9040	(22b)
Effective ac	0.9649	0.9457	0.9270	0.8559	0.8392	0.7762	0.7762	0.7762	0.7762	0.8559	0.8731	0.9086	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			128.6500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.3752			(33)
Party Ceiling 1			57.9400					(32b)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	25.7300	(36)
Point Thermal bridges (36a) =	0.0000	

Total fabric heat loss (33) + (36) + (36a) = 71.1052 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	53.6463	52.5806	51.5372	47.5883	46.6572	43.1570	43.1570	43.1570	43.1570	47.5883	48.5419	50.5163	(38)
Heat transfer coeff	124.7516	123.6858	122.6425	118.6935	117.7624	114.2622	114.2622	114.2622	114.2622	118.6935	119.6471	121.6216	(39)
Average = Sum(39)m / 12 =												118.7122	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9770	1.9602	1.9436	1.8810	1.8663	1.8108	1.8108	1.8108	1.8108	1.8810	1.8962	1.9274	(40)
HLP (average)												1.8813	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.0678 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)
Average daily hot water use (litres/day)												93.5492	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)										Total = Sum(45)m =		1553.9731	
Distribution loss (46)m = 0.15 x (45)m	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.8759	49.3893	45.7869	45.6072	42.3688	43.1203	44.5165	44.4999	47.8950	48.3885	50.9589	(61)
Total heat required for water heating calculated for each month	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
									Total per year (kWh/year) = Sum(64)m =			2113.3393	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month	66.4355	58.6606	61.8773	53.7079	51.4619	45.7181	44.8074	47.0947	48.1222	54.3808	58.5778	65.6933	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	17.6213	15.6511	12.7283	9.6362	7.2031	6.0812	6.5709	8.5412	11.4639	14.5561	16.9891	18.1111	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	269.6896	272.4882	265.4360	250.4226	231.4710	213.6591	201.7597	198.9612	206.0134	221.0267	239.9784	257.7902	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)	89.2950	87.2926	83.1684	74.5943	69.1692	63.4974	60.2250	63.2993	66.8364	73.0925	81.3581	88.2975	(72)
Total internal gains	474.4363	473.2622	459.1630	432.4834	405.6737	374.0681	359.3860	361.6320	375.1441	406.5057	436.1559	462.0291	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	33.9635	0.7600	0.8000	0.7700	57.8137	(77)
Southwest	5.9000	33.9635	0.7600	0.8000	0.7700	84.4310	(79)
Northwest	0.4500	10.4150	0.7600	0.8000	0.7700	1.9747	(81)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	144.2194	252.0167	363.1685	463.9888	513.0693	520.9954	486.4968	436.6121	398.4388	290.9492	175.9167	127.2602	(83)
Total gains	618.6557	725.2790	822.3315	896.4722	918.7429	895.0635	845.8828	798.2441	773.5829	697.4549	612.0727	589.2893	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.1254	35.4280	35.7294	36.9181	37.2101	38.3499	38.3499	38.3499	38.3499	36.9181	36.6239	36.0293	
alpha	3.3417	3.3619	3.3820	3.4612	3.4807	3.5567	3.5567	3.5567	3.5567	3.4612	3.4416	3.4020	
util living area	0.9869	0.9772	0.9575	0.9128	0.8287	0.6890	0.5725	0.6084	0.7879	0.9330	0.9777	0.9888	(86)
MIT	18.8992	19.1562	19.5655	20.1092	20.5515	20.8436	20.9373	20.9221	20.7287	20.1427	19.4793	18.8989	(87)

Th 2	19.3487	19.3600	19.3712	19.4138	19.4240	19.4624	19.4624	19.4624	19.4624	19.4138	19.4035	19.3821	(88)
util rest of house	0.9821	0.9691	0.9417	0.8787	0.7572	0.5627	0.4030	0.4375	0.6822	0.8994	0.9681	0.9848	(89)
MIT 2	17.5476	17.8078	18.2140	18.7595	19.1555	19.4010	19.4487	19.4441	19.3336	18.8036	18.1596	17.5703	(90)
Living area fraction									fLA = Living area / (4) =			0.3472	(91)
MIT	18.0169	18.2760	18.6833	19.2282	19.6402	19.9019	19.9656	19.9573	19.8180	19.2686	18.6178	18.0317	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.8669	18.1260	18.5333	19.0782	19.4902	19.7519	19.8156	19.8073	19.6680	19.1186	18.4678	17.8817	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9758	0.9604	0.9308	0.8697	0.7607	0.5893	0.4450	0.4795	0.6989	0.8911	0.9600	0.9792	(94)
Useful gains	603.6813	696.5738	765.4202	779.6283	698.9228	527.4205	376.4430	382.7643	540.6270	621.4980	587.5817	577.0274	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1642.5942	1598.7629	1451.2624	1184.3454	882.0690	577.2389	390.2724	400.7493	636.2125	999.2322	1312.2687	1615.3362	(97)
Space heating kWh	772.9512	606.2711	510.2667	291.3963	136.2608	0.0000	0.0000	0.0000	0.0000	281.0342	521.7747	772.5018	(98a)
Space heating requirement - total per year (kWh/year)												3892.4566	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	772.9512	606.2711	510.2667	291.3963	136.2608	0.0000	0.0000	0.0000	0.0000	281.0342	521.7747	772.5018	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3892.4566	
Space heating per m2											(98c) / (4) =	61.6871	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	772.9512	606.2711	510.2667	291.3963	136.2608	0.0000	0.0000	0.0000	0.0000	281.0342	521.7747	772.5018	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	920.1800	721.7513	607.4603	346.9003	162.2152	0.0000	0.0000	0.0000	0.0000	334.5646	621.1603	919.6450	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8816	81.6818	81.2702	80.4070	78.8052	75.0000	75.0000	75.0000	75.0000	80.2967	81.4106	81.8977	(217)
Fuel for water heating, kWh/month	259.4599	229.9236	244.0644	215.0162	210.7584	197.3476	193.9442	203.5781	207.6931	218.4835	231.1495	256.6834	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.4238	12.3736	11.1410	8.1624	6.3049	5.1511	5.7515	7.4760	9.7106	12.7409	14.3908	15.8525	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4633.8770	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2668.1021	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	124.4792	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7541.4582	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4633.8770	5.6000	259.4971	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2668.1021	5.6000	149.4137	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	124.4792	26.0600	32.4393	(250)
Additional standing charges			99.0000	(251)
Total energy cost			570.3191	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4633.8770	0.2100	973.1142	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2668.1021	0.2100	560.3014	(264)
Space and water heating			1533.4156	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	124.4792	0.1443	17.9662	(268)
Total CO2, kg/year			1567.3337	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4633.8770	1.1300	5236.2810	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2668.1021	1.1300	3014.9553	(278)
Space and water heating			8251.2363	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	124.4792	1.5338	190.9303	(282)
Total Primary energy kWh/year			8616.1386	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 5

Current energy efficiency rating: C 78
Current environmental impact rating: C 80

N Solar water heating Not applicable
U Solar photovoltaic panels Not applicable
V2 Wind turbine Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: C 78
Potential environmental impact rating: C 80

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£62	£62	£0
Mains gas	£508	£508	£0
Space heating	£388	£388	£0
Water heating	£149	£149	£0
Lighting	£32	£32	£0
Total cost of fuels	£570	£570	£0
Total cost of uses	£569	£569	£0
Delivered energy	120 kWh/m²	120 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.6 tonnes	1.6 tonnes	0.0 tonnes
CO2 emissions per m²	25 kg/m²	25 kg/m²	0 kg/m²
Primary energy	137 kWh/m²	137 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)

Ground floor	63.1000 (1b) x	2.6700 (2b) =	168.4770 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	168.4770 (5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys		0 * 80 =	0.0000 (6a)
Number of open flues		0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire		0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler		0 * 20 =	0.0000 (6d)
Number of flues attached to other heater		0 * 35 =	0.0000 (6e)
Number of blocked chimneys		0 * 20 =	0.0000 (6f)
Number of intermittent extract fans		2 * 10 =	20.0000 (7a)
Number of passive vents		0 * 10 =	0.0000 (7b)
Number of flueless gas fires		0 * 40 =	0.0000 (7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =		20.0000 / (5) =	0.1187 (8)
Pressure test			No
Pressure Test Method			Blower Door
Measured/design AP50			15.0000 (17)
Infiltration rate			0.8687 (18)
Number of sides sheltered			1 (19)
Shelter factor		(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor		(21) = (18) x (20) =	0.8036 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0245	1.0044	0.9844	0.8839	0.8638	0.7634	0.7634	0.7433	0.8036	0.8638	0.9040	0.9442	(22b)
Effective ac	1.0245	1.0044	0.9845	0.8907	0.8731	0.7914	0.7914	0.7762	0.8229	0.8731	0.9086	0.9457	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			128.6500					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	45.3752			(33)
Party Ceiling 1			57.9400					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							25.7300	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		71.1052	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	56.9615	55.8446	54.7345	49.5179	48.5419	43.9983	43.9983	43.1570	45.7484	48.5419	50.5163	52.5806	(38)
Heat transfer coeff	128.0667	126.9499	125.8398	120.6231	119.6471	115.1036	115.1036	114.2622	116.8537	119.6471	121.6216	123.6858	(39)
Average = Sum(39)m / 12 =												120.6170	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.0296	2.0119	1.9943	1.9116	1.8962	1.8241	1.8241	1.8108	1.8519	1.8962	1.9274	1.9602	(40)
HLP (average)												1.9115	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy			2.0678 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)
Average daily hot water use (litres/day)												93.5492	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)											Total = Sum(45)m =	1553.9731	
Distribution loss (46)m = 0.15 x (45)m	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.8759	49.3893	45.7869	45.6072	42.3688	43.1203	44.5165	44.4999	47.8950	48.3885	50.9589	(61)
Total heat required for water heating calculated for each month	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
											Total per year (kWh/year) = Sum(64)m =	2113.3393	(64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

	66.4355	58.6606	61.8773	53.7079	51.4619	45.7181	44.8074	47.0947	48.1222	54.3808	58.5778	65.6933 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	(66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

	17.6213	15.6511	12.7283	9.6362	7.2031	6.0812	6.5709	8.5412	11.4639	14.5561	16.9891	18.1111	(67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

	269.6896	272.4882	265.4360	250.4226	231.4710	213.6591	201.7597	198.9612	206.0134	221.0267	239.9784	257.7902	(68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)

Losses e.g. evaporation (negative values) (Table 5)

	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)

Water heating gains (Table 5)

	89.2950	87.2926	83.1684	74.5943	69.1692	63.4974	60.2250	63.2993	66.8364	73.0925	81.3581	88.2975	(72)

Total internal gains

	474.4363	473.2622	459.1630	432.4834	405.6737	374.0681	359.3860	361.6320	375.1441	406.5057	436.1559	462.0291	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	36.7938	0.7600	0.8000	0.7700	62.6316	(77)
Southwest	5.9000	36.7938	0.7600	0.8000	0.7700	91.4669	(79)
Northwest	0.4500	11.2829	0.7600	0.8000	0.7700	2.1393	(81)

Solar gains	156.2377	266.8413	366.9913	457.8837	515.7555	513.2960	494.3435	450.9744	398.4388	295.4253	187.2662	133.6232	(83)
Total gains	630.6740	740.1035	826.1543	890.3671	921.4292	887.3641	853.7295	812.6063	773.5829	701.9310	623.4221	595.6523	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	34.2161	34.5171	34.8216	36.3276	36.6239	38.0696	38.0696	38.3499	37.4994	36.6239	36.0293	35.4280	
alpha	3.2811	3.3011	3.3214	3.4218	3.4416	3.5380	3.5380	3.5567	3.5000	3.4416	3.4020	3.3619	
util living area	0.9871	0.9774	0.9593	0.9190	0.8417	0.7022	0.5513	0.5906	0.7936	0.9340	0.9785	0.9893	(86)
MIT	18.7799	19.0610	19.4803	20.0433	20.4958	20.8282	20.9458	20.9307	20.7102	20.1196	19.3921	18.7962	(87)
Th 2	19.3137	19.3254	19.3371	19.3929	19.4035	19.4531	19.4531	19.4624	19.4339	19.4035	19.3821	19.3600	(88)
util rest of house	0.9825	0.9694	0.9442	0.8872	0.7750	0.5778	0.3765	0.4181	0.6875	0.9012	0.9695	0.9855	(89)
MIT 2	17.4056	17.6900	18.1072	18.6831	19.0930	19.3837	19.4426	19.4470	19.2962	18.7742	18.0587	17.4531	(90)
Living area fraction									fLA = Living area / (4) =			0.3472	(91)
MIT	17.8828	18.1660	18.5840	19.1554	19.5800	19.8853	19.9645	19.9622	19.7872	19.2413	18.5217	17.9195	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.7328	18.0160	18.4340	19.0054	19.4300	19.7353	19.8145	19.8122	19.6372	19.0913	18.3717	17.7695	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9761	0.9606	0.9331	0.8774	0.7763	0.6034	0.4204	0.4608	0.7039	0.8926	0.9614	0.9800	(94)
Useful gains	615.6236	710.9291	770.9165	781.2255	715.3058	535.3999	358.8709	374.4573	544.4938	626.5715	599.3835	583.7150	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1720.2953	1665.0788	1501.7656	1218.9461	924.8770	591.0907	370.0060	389.8851	647.0376	1015.9653	1370.8800	1678.3528	(97)
Space heating kWh	821.8758	641.1886	543.7518	315.1588	155.9210	0.0000	0.0000	0.0000	0.0000	289.7090	555.4775	814.4105	(98a)

Space heating requirement - total per year (kWh/year) 4137.4930

Solar heating kWh

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)

Solar heating contribution - total per year (kWh/year) 0.0000

Space heating kWh

	821.8758	641.1886	543.7518	315.1588	155.9210	0.0000	0.0000	0.0000	0.0000	289.7090	555.4775	814.4105	(98c)

Space heating requirement after solar contribution - total per year (kWh/year) 4137.4930

Space heating per m2 (98c) / (4) = 65.5704 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
Fraction of space heat from main system(s)	1.0000 (202)
Efficiency of main space heating system 1 (in %)	84.0000 (206)
Efficiency of main space heating system 2 (in %)	0.0000 (207)
Efficiency of secondary/supplementary heating system, %	0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	821.8758	641.1886	543.7518	315.1588	155.9210	0.0000	0.0000	0.0000	0.0000	289.7090	555.4775	814.4105	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	978.4236	763.3198	647.3235	375.1891	185.6202	0.0000	0.0000	0.0000	0.0000	344.8917	661.2827	969.5363	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)

Space heating fuel (main heating system 2)												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating												
Water heating requirement												
212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
Efficiency of water heater												
(217)m 81.9794	81.7768	81.3895	80.5748	79.1039	75.0000	75.0000	75.0000	75.0000	80.3628	81.5245	81.9816	(217)
Fuel for water heating, kWh/month												
259.1504	229.6563	243.7065	214.5684	209.9626	197.3476	193.9442	203.5781	207.6931	218.3039	230.8266	256.4207	(219)
Space cooling fuel requirement												
(221)m 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa 9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting 15.4238	12.3736	11.1410	8.1624	6.3049	5.1511	5.7515	7.4760	9.7106	12.7409	14.3908	15.8525	(232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4925.5869	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2665.1585	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	124.4792	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7830.2246	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4925.5869	3.6400	179.2914	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2665.1585	3.6400	97.0118	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	124.4792	16.4900	20.5266	(250)
Additional standing charges			92.0000	(251)
Total energy cost			407.7932	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.3581	(257)
SAP value		77.9860	
SAP rating (Section 12)		78	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4925.5869	0.2100	1034.3732	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2665.1585	0.2100	559.6833	(264)
Space and water heating			1594.0565	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	124.4792	0.1443	17.9662	(268)
Total CO2, kg/year			1627.9746	(272)
CO2 emissions per m2			25.8000	(273)
EI value			79.8197	
EI rating			80	(274)
EI band			C	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	63.1000	(1b)	x 2.6700	(2b) =	168.4770	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	63.1000					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		168.4770	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1187	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8687	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8036	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9643	0.9442	0.9241	0.8437	0.8236	0.7433	0.7433	0.7433	0.7433	0.8437	0.8638	0.9040	(22b)
Effective ac	0.9649	0.9457	0.9270	0.8559	0.8392	0.7762	0.7762	0.7762	0.7762	0.8559	0.8731	0.9086	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.3900	1.3258	13.7746			(27)
Heatloss Floor 1			63.1000	0.2500	15.7750			(28a)
External Wall 1	60.3900	10.3900	50.0000	0.3000	15.0000			(29a)
External Roof 1	5.1600		5.1600	0.1600	0.8256			(30)
Total net area of external elements Aum(A, m2)			128.6500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		45.3752			(33)
Party Ceiling 1			57.9400					(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							25.7300	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		71.1052	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	53.6463	52.5806	51.5372	47.5883	46.6572	43.1570	43.1570	43.1570	43.1570	47.5883	48.5419	50.5163	(38)
Heat transfer coeff	124.7516	123.6858	122.6425	118.6935	117.7624	114.2622	114.2622	114.2622	114.2622	118.6935	119.6471	121.6216	(39)
Average = Sum(39)m / 12 =												118.7122	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.9770	1.9602	1.9436	1.8810	1.8663	1.8108	1.8108	1.8108	1.8108	1.8810	1.8962	1.9274	(40)
HLP (average)												1.8813	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.0678	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	66.1609	65.1666	63.7177	60.9456	58.8999	56.6185	55.3218	56.7596	58.3358	60.7853	63.6170	65.9074	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	35.8062	34.5042	33.2022	31.9001	30.5981	29.2960	29.2960	30.5981	31.9001	33.2022	34.5042	35.8062	(42c)
Average daily hot water use (litres/day)												93.5492	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.9671	99.6708	96.9199	92.8457	89.4980	85.9145	84.6178	87.3577	90.2359	93.9875	98.1212	101.7136	(44)
Energy conte	161.4910	141.9299	148.9623	127.1012	120.4814	105.6419	102.3379	108.1671	111.2699	127.5401	139.7916	159.2589	(45)
Energy content (annual)										Total = Sum(45)m =		1553.9731	
Distribution loss (46)m = 0.15 x (45)m	24.2236	21.2895	22.3443	19.0652	18.0722	15.8463	15.3507	16.2251	16.6905	19.1310	20.9687	23.8888	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.8759	49.3893	45.7869	45.6072	42.3688	43.1203	44.5165	44.4999	47.8950	48.3885	50.9589	(61)

Total heat required for water heating calculated for each month

	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
										Total per year (kWh/year) = Sum(64)m =		2113.3393	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
							Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.4355	58.6606	61.8773	53.7079	51.4619	45.7181	44.8074	47.0947	48.1222	54.3808	58.5778	65.6933	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	124.0674	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.6213	15.6511	12.7283	9.6362	7.2031	6.0812	6.5709	8.5412	11.4639	14.5561	16.9891	18.1111	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	269.6896	272.4882	265.4360	250.4226	231.4710	213.6591	201.7597	198.9612	206.0134	221.0267	239.9784	257.7902	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	49.4745	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	-82.7116	(71)
Water heating gains (Table 5)													
	89.2950	87.2926	83.1684	74.5943	69.1692	63.4974	60.2250	63.2993	66.8364	73.0925	81.3581	88.2975	(72)
Total internal gains													
	474.4363	473.2622	459.1630	432.4834	405.6737	374.0681	359.3860	361.6320	375.1441	406.5057	436.1559	462.0291	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.0400	33.9635	0.7600	0.8000	0.7700	57.8137	(77)
Southwest	5.9000	33.9635	0.7600	0.8000	0.7700	84.4310	(79)
Northwest	0.4500	10.4150	0.7600	0.8000	0.7700	1.9747	(81)

Solar gains	144.2194	252.0167	363.1685	463.9888	513.0693	520.9954	486.4968	436.6121	398.4388	290.9492	175.9167	127.2602	(83)
Total gains	618.6557	725.2790	822.3315	896.4722	918.7429	895.0635	845.8828	798.2441	773.5829	697.4549	612.0727	589.2893	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	35.1254	35.4280	35.7294	36.9181	37.2101	38.3499	38.3499	38.3499	38.3499	36.9181	36.6239	36.0293	
alpha	3.3417	3.3619	3.3820	3.4612	3.4807	3.5567	3.5567	3.5567	3.5567	3.4612	3.4416	3.4020	
util living area													
	0.9869	0.9772	0.9575	0.9128	0.8287	0.6890	0.5725	0.6084	0.7879	0.9330	0.9777	0.9888	(86)
MIT	18.8992	19.1562	19.5655	20.1092	20.5515	20.8436	20.9373	20.9221	20.7287	20.1427	19.4793	18.8989	(87)
Th 2	19.3487	19.3600	19.3712	19.4138	19.4240	19.4624	19.4624	19.4624	19.4624	19.4138	19.4035	19.3821	(88)
util rest of house													
	0.9821	0.9691	0.9417	0.8787	0.7572	0.5627	0.4030	0.4375	0.6822	0.8994	0.9681	0.9848	(89)
MIT 2	17.5476	17.8078	18.2140	18.7595	19.1555	19.4010	19.4487	19.4441	19.3336	18.8036	18.1596	17.5703	(90)
Living area fraction									fLA = Living area / (4) =			0.3472	(91)
MIT	18.0169	18.2760	18.6833	19.2282	19.6402	19.9019	19.9656	19.9573	19.8180	19.2686	18.6178	18.0317	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.8669	18.1260	18.5333	19.0782	19.4902	19.7519	19.8156	19.8073	19.6680	19.1186	18.4678	17.8817	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9758	0.9604	0.9308	0.8697	0.7607	0.5893	0.4450	0.4795	0.6989	0.8911	0.9600	0.9792	(94)
Useful gains	603.6813	696.5738	765.4202	779.6283	698.9228	527.4205	376.4430	382.7643	540.6270	621.4980	587.5817	577.0274	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1642.5942	1598.7629	1451.2624	1184.3454	882.0690	577.2389	390.2724	400.7493	636.2125	999.2322	1312.2687	1615.3362	(97)
Space heating kWh													
	772.9512	606.2711	510.2667	291.3963	136.2608	0.0000	0.0000	0.0000	0.0000	281.0342	521.7747	772.5018	(98a)
Space heating requirement - total per year (kWh/year)												3892.4566	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	772.9512	606.2711	510.2667	291.3963	136.2608	0.0000	0.0000	0.0000	0.0000	281.0342	521.7747	772.5018	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3892.4566	
Space heating per m2											(98c) / (4) =	61.6871	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	772.9512	606.2711	510.2667	291.3963	136.2608	0.0000	0.0000	0.0000	0.0000	281.0342	521.7747	772.5018	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	920.1800	721.7513	607.4603	346.9003	162.2152	0.0000	0.0000	0.0000	0.0000	334.5646	621.1603	919.6450	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	212.4499	187.8057	198.3516	172.8881	166.0886	148.0107	145.4581	152.6836	155.7698	175.4351	188.1801	210.2178	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8816	81.6818	81.2702	80.4070	78.8052	75.0000	75.0000	75.0000	75.0000	80.2967	81.4106	81.8977	(217)
Fuel for water heating, kWh/month													
	259.4599	229.9236	244.0644	215.0162	210.7584	197.3476	193.9442	203.5781	207.6931	218.4835	231.1495	256.6834	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.4238	12.3736	11.1410	8.1624	6.3049	5.1511	5.7515	7.4760	9.7106	12.7409	14.3908	15.8525	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4633.8770	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2668.1021	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	124.4792	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7541.4582	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4633.8770	5.6000	259.4971	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2668.1021	5.6000	149.4137	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	124.4792	26.0600	32.4393	(250)
Additional standing charges			99.0000	(251)
Total energy cost			570.3191	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4633.8770	0.2100	973.1142	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2668.1021	0.2100	560.3014	(264)
Space and water heating			1533.4156	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	124.4792	0.1443	17.9662	(268)
Total CO2, kg/year			1567.3337	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4633.8770	1.1300	5236.2810	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2668.1021	1.1300	3014.9553	(278)
Space and water heating			8251.2363	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	124.4792	1.5338	190.9303	(282)
Total Primary energy kWh/year			8616.1386	(286)

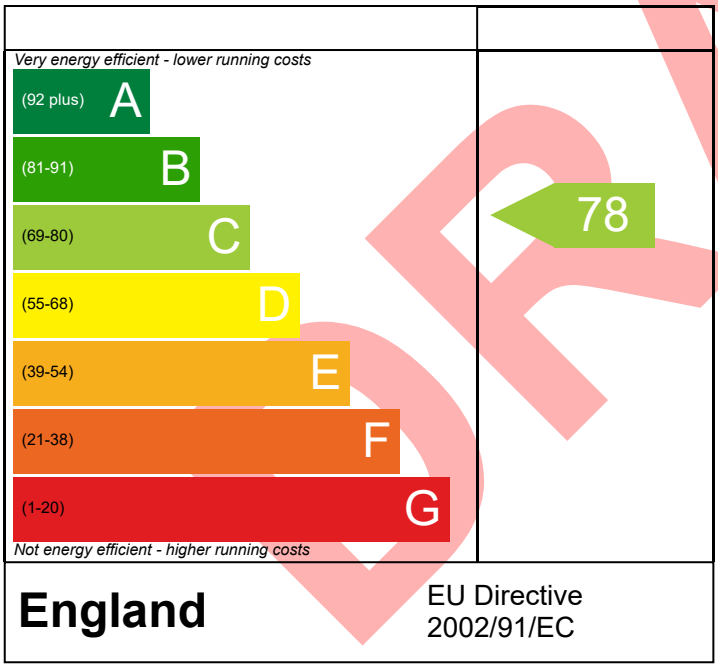
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	63.1 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

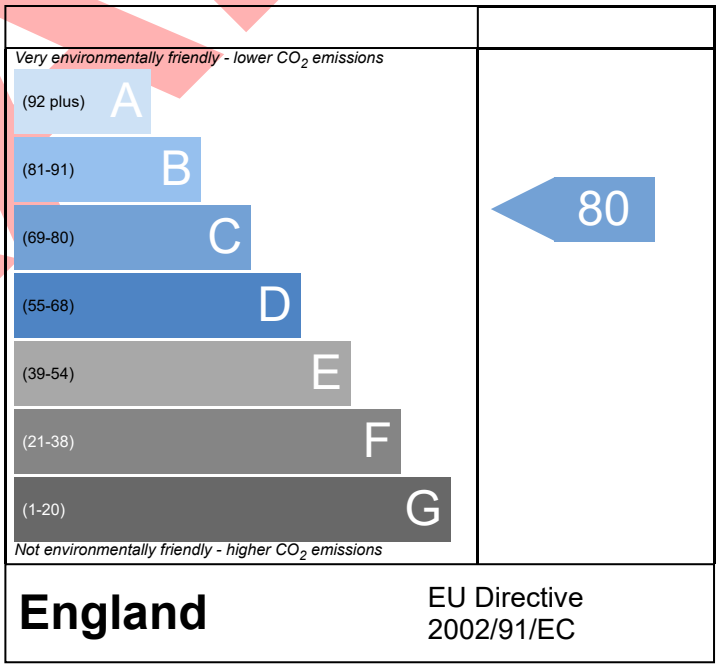
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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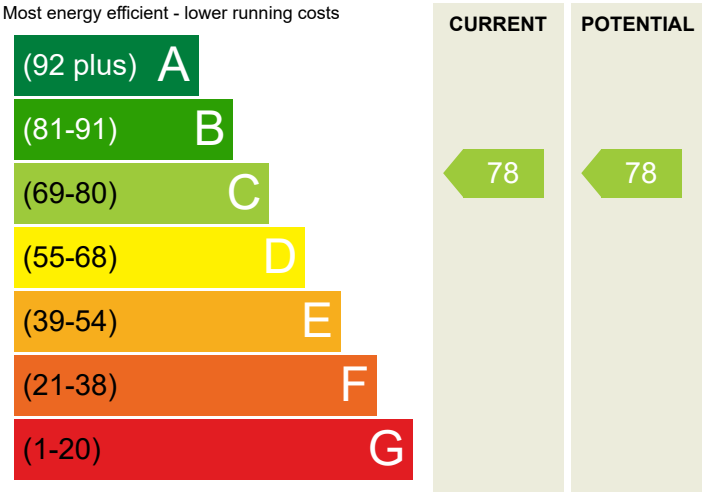
Energy Report

Dwelling Address	
Reference	Apt. 5-Apt. 5
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	63

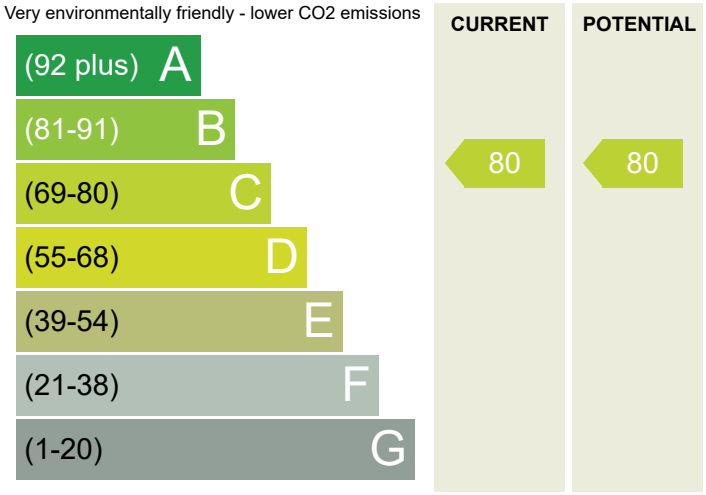
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

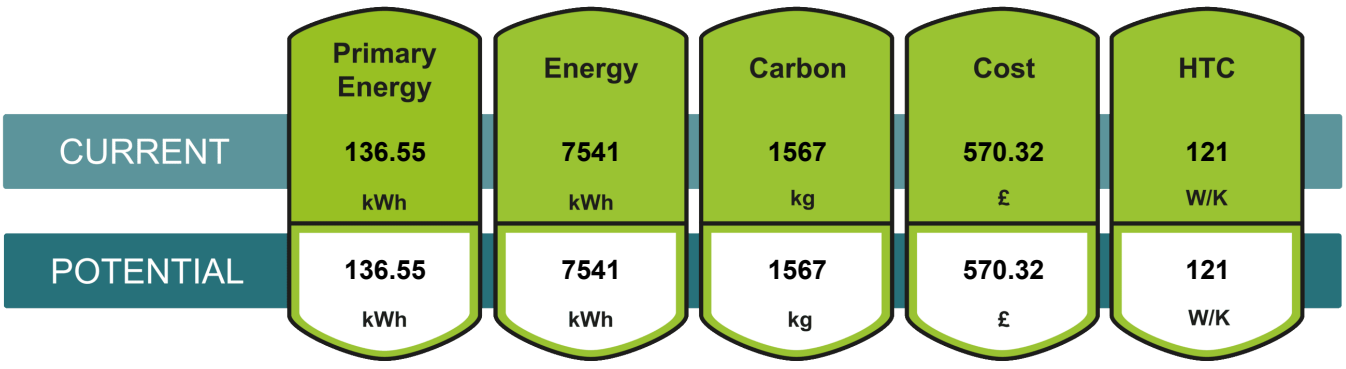
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Floor	Average thermal transmittance 0.25 W/m²K	Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£32	£32	
Heating	£388	£388	
Hot Water	£149	£149	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£570	£570	

Estimated energy use and potential savings

Space Heating
4634
kWh per year

Water Heating
2668
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 5	Issued on Date	01/10/2024
Assessment Reference	Apt. 5	Prop Type Ref	Detached Flat
Property			

SAP Rating	78 C	DER	26.38	TER	
Environmental	80 C	% DER < TER			N/A
CO_2 Emissions (t/year)	1.57	DFEE	74.00	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	144.83	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northeast (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	60.39	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	5.16	m²	

Comments

Heat Loss Floors

Description	Heatloss Floor 1		
Type	Ground Floor - Solid		
Construction	Other		
U-value	0.25	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Area	63.10	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SE1	New Glazing	External Wall 1	South East	4.04
W SW1	New Glazing	External Wall 1	South West	5.90
W NW1	New Glazing	External Wall 1	North West	0.45

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System No

Comments

Lighting

No Fixed Lighting No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1 SAP table

Fuel Type Mains gas

Winter Efficiency 84.00 %

Summer Efficiency 75.00 %

Model Name

Manufacturer	
System Type	
Flue Type	None or Unknown
Fan Assisted Flue	No
Heat Emitter	Radiators
Flow Temperature	Unknown
Flow Temperature Value	

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2	None
Secondary Heating	None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder	None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 6	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 6	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	27.17	**TER**	
Environmental	80 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.41	**DFEE**	74.23	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	149.37	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.75 m	55.17 m²	3.01 m

8.0 Living Area	22.06	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	44.58	36.86	0.00	None	7.72	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	55.17	55.17	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	55.17

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NE1	New Glazing	External Wall 1	North East	5.36	0
W NW1	New Glazing	External Wall 1	North West	2.36	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

Summary for Input Data

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Main Heating 1	
SAP Code	901	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
Immersion Heater	Single	
Summer Immersion	No	
Cold Water Source	From mains	
Bath Count	0	
Supplementary Immersion	No	
Immersion Only Heating Hot Water	No	

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 6	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 6	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	27.17	**TER**	
Environmental	80 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.41	**DFEE**	74.23	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	149.37	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8704 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9433	0.9248	0.9063	0.8139	0.7954	0.7029	0.7029	0.6844	0.7399	0.7954	0.8324	0.8693	(22b)
Effective ac	0.9449	0.9277	0.9107	0.8312	0.8163	0.7470	0.7470	0.7342	0.7737	0.8163	0.8464	0.8779	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			99.7500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.1200			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		19.9500 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	50.0700 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.7831	50.8363	49.9083	45.5491	44.7336	40.9369	40.9369	40.2338	42.3993	44.7336	46.3835	48.1084	(38)
Heat transfer coeff	101.8532	100.9064	99.9783	95.6192	94.8036	91.0069	91.0069	90.3039	92.4694	94.8036	96.4535	98.1784	(39)
Average = Sum(39)m / 12 =												95.6153	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.8462	1.8290	1.8122	1.7332	1.7184	1.6496	1.6496	1.6368	1.6761	1.7184	1.7483	1.7796	(40)
HLP (average)												1.7331	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8423	(42)
Hot water usage for mixer showers													
	61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												87.5198	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	
Distribution loss (46)m = 0.15 x (45)m													
	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.6123	42.9191	46.2061	42.8359	42.6677	39.6381	40.3411	41.6473	41.6318	44.8081	45.2698	48.4914	(61)
Total heat required for water heating calculated for each month													
	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)
										Total per year (kWh/year) = Sum(64)m =		1978.8848	(64)
12Total per year (kWh/year)												1979	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	62.3880	54.8798	57.8892	50.2463	48.1451	42.7715	41.9195	44.0593	45.0206	50.8759	54.8024	61.6635	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	84.5308	93.5876	84.5308	87.3484	84.5308	87.3484	84.5308	84.5308	87.3484	84.5308	87.3484	84.5308	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	160.6236	162.2904	158.0902	149.1484	137.8611	127.2526	120.1654	118.4987	122.6989	131.6406	142.9280	153.5365	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	83.8548	81.6664	77.8080	69.7865	64.7111	59.4049	56.3434	59.2195	62.5287	68.3815	76.1144	82.8810	(72)
Total internal gains													
	386.6443	395.1795	378.0641	363.9185	344.7380	324.6410	311.6747	312.8840	323.2111	342.1880	364.0259	378.5833	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northwest	2.3600	11.2829	0.7600	0.8000	0.7700	11.2194	(81)

Solar gains	36.7009	74.7057	134.5959	221.0451	297.1280	316.7699	296.3318	236.2391	164.0072	91.2963	46.1792	29.9718	(83)
Total gains	423.3452	469.8852	512.6600	584.9637	641.8661	641.4109	608.0065	549.1232	487.2183	433.4843	410.2051	408.5551	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6154	37.9684	38.3208	40.0678	40.4125	42.0984	42.0984	42.4262	41.4326	40.4125	39.7212	39.0233	
alpha	3.5077	3.5312	3.5547	3.6712	3.6942	3.8066	3.8066	3.8284	3.7622	3.6942	3.6481	3.6016	
util living area													
	0.9943	0.9911	0.9838	0.9578	0.8913	0.7522	0.6056	0.6710	0.8815	0.9725	0.9907	0.9951	(86)
MIT	18.7927	18.9961	19.3609	19.9519	20.4549	20.8219	20.9426	20.9162	20.6302	20.0062	19.3630	18.8335	(87)
Th 2	19.4379	19.4498	19.4615	19.5172	19.5277	19.5772	19.5772	19.5864	19.5580	19.5277	19.5064	19.4843	(88)
util rest of house													
	0.9922	0.9878	0.9773	0.9394	0.8400	0.6382	0.4340	0.5020	0.8037	0.9569	0.9867	0.9933	(89)
MIT 2	17.5034	17.7136	18.0833	18.6992	19.1704	19.4995	19.5646	19.5649	19.3574	18.7678	18.1189	17.5760	(90)
Living area fraction									fLA = Living area / (4) =			0.3999	(91)
MIT	18.0190	18.2264	18.5941	19.2001	19.6840	20.0283	20.1156	20.1052	19.8664	19.2630	18.6164	18.0788	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.8690	18.0764	18.4441	19.0501	19.5340	19.8783	19.9656	19.9552	19.7164	19.1130	18.4664	17.9288	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9890	0.9834	0.9711	0.9317	0.8403	0.6656	0.4847	0.5510	0.8145	0.9507	0.9825	0.9905	(94)
Useful gains	418.6935	462.0977	497.8636	544.9848	539.3542	426.9237	294.6862	302.5829	396.8203	412.1341	403.0193	404.6721	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1382.0439	1329.5833	1194.1553	970.5434	742.6941	480.3619	306.2937	321.0500	519.3415	807.0643	1096.3274	1347.8716	(97)
Space heating kWh	716.7327	582.9503	518.0410	306.4022	151.2849	0.0000	0.0000	0.0000	0.0000	293.8280	499.1818	701.7404	(98a)
Space heating requirement - total per year (kWh/year)												3770.1614	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	716.7327	582.9503	518.0410	306.4022	151.2849	0.0000	0.0000	0.0000	0.0000	293.8280	499.1818	701.7404	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3770.1614	
Space heating per m2											(98c) / (4) =	68.3372	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	716.7327	582.9503	518.0410	306.4022	151.2849	0.0000	0.0000	0.0000	0.0000	293.8280	499.1818	701.7404	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	853.2532	693.9885	616.7155	364.7645	180.1011	0.0000	0.0000	0.0000	0.0000	349.7953	594.2641	835.4053	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8595	81.7286	81.4231	80.6560	79.1854	75.0000	75.0000	75.0000	75.0000	80.5364	81.4516	81.8431	(217)
Fuel for water heating, kWh/month	243.9483	214.9813	227.9052	200.5370	196.2280	184.6282	181.4441	190.4571	194.3068	203.7936	216.1425	241.2980	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.1426	11.3457	10.2156	7.4844	5.7811	4.7232	5.2737	6.8550	8.9040	11.6825	13.1954	14.5357	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4488.2874	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2495.6700	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	114.1389	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7213.0963	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4488.2874	0.2100	942.5404	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2495.6700	0.2100	524.0907	(264)
Space and water heating			1466.6310	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.1389	0.1443	16.4738	(268)
Total CO2, kg/year			1499.0567	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			27.1700	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4488.2874	1.1300	5071.7647	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2495.6700	1.1300	2820.1071	(278)
Space and water heating			7891.8718	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	114.1389	1.5338	175.0700	(282)
Total Primary energy kWh/year			8240.9139	(286)
Dwelling Primary energy Rate (DPER)			149.3700	(287)

Full SAP Calculation Printout

Property Reference	Apt. 6	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 6	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	27.17	**TER**	
Environmental	80 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.41	**DFEE**	74.23	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	149.37	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8704 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9433	0.9248	0.9063	0.8139	0.7954	0.7029	0.7029	0.6844	0.7399	0.7954	0.8324	0.8693	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9449	0.9277	0.9107	0.8312	0.8163	0.7470	0.7470	0.7342	0.7737	0.8163	0.8464	0.8779	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			99.7500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.1200			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		19.9500 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	50.0700 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.7831	50.8363	49.9083	45.5491	44.7336	40.9369	40.9369	40.2338	42.3993	44.7336	46.3835	48.1084	(38)
Heat transfer coeff	101.8532	100.9064	99.9783	95.6192	94.8036	91.0069	91.0069	90.3039	92.4694	94.8036	96.4535	98.1784	(39)
Average = Sum(39)m / 12 =												95.6153	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8462	1.8290	1.8122	1.7332	1.7184	1.6496	1.6496	1.6368	1.6761	1.7184	1.7483	1.7796	(40)
HLP (average)												1.7331	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8423	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	23.8221	23.4683	22.9701	22.0515	21.3636	20.6009	20.1890	20.6837	21.2223	22.0385	22.9760	23.7416	(42b)
Hot water usage for other uses													
	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												52.5390	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	57.3195	55.7476	54.0313	51.8946	49.9887	48.0079	47.5959	49.3087	51.0655	53.0997	55.2553	57.2390	(44)
Energy conte	90.7801	79.3839	83.0441	71.0412	67.2944	59.0313	57.5631	61.0545	62.9688	72.0558	78.7213	89.6224	(45)
Energy content (annual)										Total = Sum(45)m =		872.5609	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	77.1631	67.4763	70.5875	60.3850	57.2002	50.1766	48.9287	51.8963	53.5235	61.2474	66.9131	76.1790	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	77.1631	67.4763	70.5875	60.3850	57.2002	50.1766	48.9287	51.8963	53.5235	61.2474	66.9131	76.1790	(64)
										Total per year (kWh/year) = Sum(64)m =		741.6768	(64)
12Total per year (kWh/year)												742	(64)
Electric shower(s)													
	44.1335	39.3233	42.9396	40.9767	41.7456	39.8213	41.1486	41.7456	40.9767	42.9396	42.1321	44.1335	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		502.0162	(64a)
Heat gains from water heating, kWh/month													
	30.3241	26.6999	28.3818	25.3404	24.7365	22.4995	22.5193	23.4105	23.6251	26.0467	27.2613	30.0781	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	84.5308	93.5876	84.5308	87.3484	84.5308	87.3484	84.5308	84.5308	87.3484	84.5308	87.3484	84.5308	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	160.6236	162.2904	158.0902	149.1484	137.8611	127.2526	120.1654	118.4987	122.6989	131.6406	142.9280	153.5365	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	40.7583	39.7320	38.1475	35.1950	33.2479	31.2493	30.2679	31.4657	32.8126	35.0091	37.8629	40.4276	(72)
Total internal gains													
	336.5477	346.2451	331.4036	322.3270	306.2749	296.4854	285.5992	285.1302	293.4950	301.8155	318.7744	329.1299	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northwest	2.3600	11.2829	0.7600	0.8000	0.7700	11.2194	(81)

Solar gains	36.7009	74.7057	134.5959	221.0451	297.1280	316.7699	296.3318	236.2391	164.0072	91.2963	46.1792	29.9718	(83)
Total gains	373.2486	420.9508	465.9995	543.3722	603.4029	613.2553	581.9310	521.3694	457.5022	393.1118	364.9536	359.1017	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6154	37.9684	38.3208	40.0678	40.4125	42.0984	42.0984	42.4262	41.4326	40.4125	39.7212	39.0233	
alpha	3.5077	3.5312	3.5547	3.6712	3.6942	3.8066	3.8066	3.8284	3.7622	3.6942	3.6481	3.6016	
util living area													
	0.9962	0.9937	0.9879	0.9659	0.9065	0.7711	0.6261	0.6949	0.8981	0.9796	0.9937	0.9968	(86)
MIT	18.7081	18.9141	19.2846	19.8897	20.4107	20.8048	20.9357	20.9052	20.5973	19.9420	19.2863	18.7488	(87)
Th 2	19.4379	19.4498	19.4615	19.5172	19.5277	19.5772	19.5772	19.5864	19.5580	19.5277	19.5064	19.4843	(88)
util rest of house													
	0.9948	0.9913	0.9830	0.9505	0.8599	0.6592	0.4517	0.5250	0.8269	0.9676	0.9908	0.9956	(89)
MIT 2	17.4194	17.6326	18.0088	18.6411	19.1347	19.4904	19.5628	19.5614	19.3339	18.7072	18.0434	17.4918	(90)
Living area fraction										fLA = Living area / (4) =		0.3999	(91)
MIT	17.9347	18.1450	18.5189	19.1404	19.6449	20.0160	20.1118	20.0987	19.8391	19.2009	18.5404	17.9944	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.9347	18.1450	18.5189	19.1404	19.6449	20.0160	20.1118	20.0987	19.8391	19.2009	18.5404	17.9944	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9927	0.9884	0.9786	0.9453	0.8645	0.6981	0.5224	0.5933	0.8443	0.9639	0.9881	0.9938	(94)
Useful gains	370.5218	416.0473	456.0280	513.6394	521.6278	428.1182	304.0017	309.3080	386.2571	378.9011	360.6145	356.8831	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1388.7357	1336.5079	1201.6335	979.1759	753.2042	492.8927	319.5943	334.0084	530.6897	815.3997	1103.4635	1354.3135	(97)
Space heating kWh													
	757.5511	618.5495	554.7304	335.1863	172.2928	0.0000	0.0000	0.0000	0.0000	324.7549	534.8513	742.0882	(98a)
Space heating requirement - total per year (kWh/year)												4040.0046	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	757.5511	618.5495	554.7304	335.1863	172.2928	0.0000	0.0000	0.0000	0.0000	324.7549	534.8513	742.0882	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4040.0046	
Space heating per m2											(98c) / (4) =	73.2283	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	855.4653	673.4514	686.3093	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.6955	0.7769	0.7212	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	594.9339	523.1915	494.9912	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	683.5683	648.7161	579.5842	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	63.8168	93.3903	62.9372	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	15.9542	23.3476	15.7343	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												55.0361	(107)
Energy for space heating												73.2283	(99)
Energy for space cooling												0.9976	(108)
Total												74.2259	(109)
Fabric Energy Efficiency (DFEE)												74.2	(109)

Full SAP Calculation Printout

Property Reference	Apt. 6	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 6	**Prop Type Ref**	
Property			

SAP Rating	78 C	**DER**	27.17	**TER**	
Environmental	80 C	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.41	**DFEE**	74.23	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	149.37	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8704 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9433	0.9248	0.9063	0.8139	0.7954	0.7029	0.7029	0.6844	0.7399	0.7954	0.8324	0.8693	(22b)
Effective ac	0.9449	0.9277	0.9107	0.8312	0.8163	0.7470	0.7470	0.7342	0.7737	0.8163	0.8464	0.8779	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			99.7500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.1200			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		19.9500 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	50.0700 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.7831	50.8363	49.9083	45.5491	44.7336	40.9369	40.9369	40.2338	42.3993	44.7336	46.3835	48.1084	(38)
Heat transfer coeff	101.8532	100.9064	99.9783	95.6192	94.8036	91.0069	91.0069	90.3039	92.4694	94.8036	96.4535	98.1784	(39)
Average = Sum(39)m / 12 =												95.6153	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.8462	1.8290	1.8122	1.7332	1.7184	1.6496	1.6496	1.6368	1.6761	1.7184	1.7483	1.7796	(40)
HLP (average)												1.7331	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8423	(42)
Hot water usage for mixer showers													
	61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												87.5198	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	
Distribution loss (46)m = 0.15 x (45)m													
	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.6123	42.9191	46.2061	42.8359	42.6677	39.6381	40.3411	41.6473	41.6318	44.8081	45.2698	48.4914	(61)
Total heat required for water heating calculated for each month													
	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)
										Total per year (kWh/year) = Sum(64)m =		1978.8848	(64)
12Total per year (kWh/year)												1979	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	62.3880	54.8798	57.8892	50.2463	48.1451	42.7715	41.9195	44.0593	45.0206	50.8759	54.8024	61.6635	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	92.1169	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	84.5308	93.5876	84.5308	87.3484	84.5308	87.3484	84.5308	84.5308	87.3484	84.5308	87.3484	84.5308	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	160.6236	162.2904	158.0902	149.1484	137.8611	127.2526	120.1654	118.4987	122.6989	131.6406	142.9280	153.5365	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	32.2117	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	83.8548	81.6664	77.8080	69.7865	64.7111	59.4049	56.3434	59.2195	62.5287	68.3815	76.1144	82.8810	(72)
Total internal gains													
	386.6443	395.1795	378.0641	363.9185	344.7380	324.6410	311.6747	312.8840	323.2111	342.1880	364.0259	378.5833	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northwest	2.3600	11.2829	0.7600	0.8000	0.7700	11.2194	(81)

Solar gains	36.7009	74.7057	134.5959	221.0451	297.1280	316.7699	296.3318	236.2391	164.0072	91.2963	46.1792	29.9718	(83)
Total gains	423.3452	469.8852	512.6600	584.9637	641.8661	641.4109	608.0065	549.1232	487.2183	433.4843	410.2051	408.5551	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6154	37.9684	38.3208	40.0678	40.4125	42.0984	42.0984	42.4262	41.4326	40.4125	39.7212	39.0233	
alpha	3.5077	3.5312	3.5547	3.6712	3.6942	3.8066	3.8066	3.8284	3.7622	3.6942	3.6481	3.6016	
util living area													
	0.9943	0.9911	0.9838	0.9578	0.8913	0.7522	0.6056	0.6710	0.8815	0.9725	0.9907	0.9951	(86)
MIT	18.7927	18.9961	19.3609	19.9519	20.4549	20.8219	20.9426	20.9162	20.6302	20.0062	19.3630	18.8335	(87)
Th 2	19.4379	19.4498	19.4615	19.5172	19.5277	19.5772	19.5772	19.5864	19.5580	19.5277	19.5064	19.4843	(88)
util rest of house													
	0.9922	0.9878	0.9773	0.9394	0.8400	0.6382	0.4340	0.5020	0.8037	0.9569	0.9867	0.9933	(89)
MIT 2	17.5034	17.7136	18.0833	18.6992	19.1704	19.4995	19.5646	19.5649	19.3574	18.7678	18.1189	17.5760	(90)
Living area fraction									fLA = Living area / (4) =			0.3999	(91)
MIT	18.0190	18.2264	18.5941	19.2001	19.6840	20.0283	20.1156	20.1052	19.8664	19.2630	18.6164	18.0788	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.8690	18.0764	18.4441	19.0501	19.5340	19.8783	19.9656	19.9552	19.7164	19.1130	18.4664	17.9288	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9890	0.9834	0.9711	0.9317	0.8403	0.6656	0.4847	0.5510	0.8145	0.9507	0.9825	0.9905	(94)
Useful gains	418.6935	462.0977	497.8636	544.9848	539.3542	426.9237	294.6862	302.5829	396.8203	412.1341	403.0193	404.6721	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1382.0439	1329.5833	1194.1553	970.5434	742.6941	480.3619	306.2937	321.0500	519.3415	807.0643	1096.3274	1347.8716	(97)
Space heating kWh	716.7327	582.9503	518.0410	306.4022	151.2849	0.0000	0.0000	0.0000	0.0000	293.8280	499.1818	701.7404	(98a)
Space heating requirement - total per year (kWh/year)												3770.1614	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	716.7327	582.9503	518.0410	306.4022	151.2849	0.0000	0.0000	0.0000	0.0000	293.8280	499.1818	701.7404	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3770.1614	
Space heating per m2											(98c) / (4) =	68.3372	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	716.7327	582.9503	518.0410	306.4022	151.2849	0.0000	0.0000	0.0000	0.0000	293.8280	499.1818	701.7404	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	853.2532	693.9885	616.7155	364.7645	180.1011	0.0000	0.0000	0.0000	0.0000	349.7953	594.2641	835.4053	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8595	81.7286	81.4231	80.6560	79.1854	75.0000	75.0000	75.0000	75.0000	80.5364	81.4516	81.8431	(217)
Fuel for water heating, kWh/month	243.9483	214.9813	227.9052	200.5370	196.2280	184.6282	181.4441	190.4571	194.3068	203.7936	216.1425	241.2980	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.1426	11.3457	10.2156	7.4844	5.7811	4.7232	5.2737	6.8550	8.9040	11.6825	13.1954	14.5357	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4488.2874	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2495.6700	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	114.1389	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7213.0963	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4488.2874	0.2100	942.5404	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2495.6700	0.2100	524.0907	(264)
Space and water heating			1466.6310	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.1389	0.1443	16.4738	(268)
Total CO2, kg/year			1499.0567	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			27.1700	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4488.2874	1.1300	5071.7647	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2495.6700	1.1300	2820.1071	(278)
Space and water heating			7891.8718	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	114.1389	1.5338	175.0700	(282)
Total Primary energy kWh/year			8240.9139	(286)
Dwelling Primary energy Rate (DPER)			149.3700	(287)

Full SAP Calculation Printout

Property Reference	Apt. 6	Issued on Date	01/10/2024
Assessment Reference	Apt. 6	Prop Type Ref	
Property			

SAP Rating	78 C	DER	27.17	TER	
Environmental	80 C	% DER < TER			N/A
CO_2 Emissions (t/year)	1.41	DFEE	74.23	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	149.37	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8704 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9433	0.9248	0.9063	0.8139	0.7954	0.7029	0.7029	0.6844	0.7399	0.7954	0.8324	0.8693	(22b)
Effective ac	0.9449	0.9277	0.9107	0.8312	0.8163	0.7470	0.7470	0.7342	0.7737	0.8163	0.8464	0.8779	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			99.7500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.1200			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		19.9500 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	50.0700 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.7831	50.8363	49.9083	45.5491	44.7336	40.9369	40.9369	40.2338	42.3993	44.7336	46.3835	48.1084	(38)
Heat transfer coeff	101.8532	100.9064	99.9783	95.6192	94.8036	91.0069	91.0069	90.3039	92.4694	94.8036	96.4535	98.1784	(39)
Average = Sum(39)m / 12 =												95.6153	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.8462	1.8290	1.8122	1.7332	1.7184	1.6496	1.6496	1.6368	1.6761	1.7184	1.7483	1.7796	(40)
HLP (average)												1.7331	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8423	(42)
Hot water usage for mixer showers													
	61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												87.5198	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	
Distribution loss (46)m = 0.15 x (45)m													
	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.6123	42.9191	46.2061	42.8359	42.6677	39.6381	40.3411	41.6473	41.6318	44.8081	45.2698	48.4914	(61)
Total heat required for water heating calculated for each month													
	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)
									Total per year (kWh/year) = Sum(64)m =			1978.8848	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	62.3880	54.8798	57.8892	50.2463	48.1451	42.7715	41.9195	44.0593	45.0206	50.8759	54.8024	61.6635	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.1575	14.3510	11.6710	8.8357	6.6048	5.5760	6.0251	7.8317	10.5116	13.3470	15.5779	16.6066	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	239.7368	242.2245	235.9555	222.6096	205.7628	189.9292	179.3514	176.8637	183.1327	196.4785	213.3253	229.1589	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	83.8548	81.6664	77.8080	69.7865	64.7111	59.4049	56.3434	59.2195	62.5287	68.3815	76.1144	82.8810	(72)
Total internal gains													
	431.4923	429.9851	417.1777	392.9750	368.8219	339.6533	326.4631	328.6580	340.9161	369.9502	396.7607	420.3897	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northwest	2.3600	11.2829	0.7600	0.8000	0.7700	11.2194	(81)

Solar gains	36.7009	74.7057	134.5959	221.0451	297.1280	316.7699	296.3318	236.2391	164.0072	91.2963	46.1792	29.9718	(83)
Total gains	468.1932	504.6908	551.7736	614.0201	665.9499	656.4233	622.7948	564.8972	504.9233	461.2465	442.9399	450.3615	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6154	37.9684	38.3208	40.0678	40.4125	42.0984	42.0984	42.4262	41.4326	40.4125	39.7212	39.0233	
alpha	3.5077	3.5312	3.5547	3.6712	3.6942	3.8066	3.8066	3.8284	3.7622	3.6942	3.6481	3.6016	
util living area													
	0.9921	0.9888	0.9798	0.9516	0.8815	0.7422	0.5944	0.6578	0.8712	0.9669	0.9882	0.9932	(86)
MIT	18.8679	19.0538	19.4237	19.9941	20.4812	20.8304	20.9462	20.9218	20.6487	20.0492	19.4178	18.9046	(87)
Th 2	19.4379	19.4498	19.4615	19.5172	19.5277	19.5772	19.5772	19.5864	19.5580	19.5277	19.5064	19.4843	(88)
util rest of house													
	0.9893	0.9848	0.9718	0.9310	0.8274	0.6274	0.4245	0.4897	0.7898	0.9487	0.9831	0.9908	(89)
MIT 2	17.5779	17.7705	18.1443	18.7381	19.1912	19.5040	19.5655	19.5666	19.3703	18.8079	18.1727	17.6464	(90)
Living area fraction									fLA = Living area / (4) =			0.3999	(91)
MIT	18.0937	18.2836	18.6559	19.2403	19.7070	20.0343	20.1176	20.1085	19.8814	19.3043	18.6706	18.1495	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9437	18.1336	18.5059	19.0903	19.5570	19.8843	19.9676	19.9585	19.7314	19.1543	18.5206	17.9995	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9853	0.9797	0.9649	0.9232	0.8287	0.6554	0.4747	0.5386	0.8020	0.9423	0.9781	0.9873	(94)
Useful gains	461.3081	494.4583	532.3945	566.8875	551.8518	430.2035	295.6438	304.2412	404.9568	434.6290	433.2593	444.6319	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1389.6528	1335.3531	1200.3309	974.3911	744.8714	480.9108	306.4717	321.3463	520.7364	810.9749	1101.5546	1354.8117	(97)
Space heating kWh	690.6885	565.0813	496.9447	293.4026	143.6065	0.0000	0.0000	0.0000	0.0000	280.0014	481.1726	677.1738	(98a)
Space heating requirement - total per year (kWh/year)												3628.0714	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	690.6885	565.0813	496.9447	293.4026	143.6065	0.0000	0.0000	0.0000	0.0000	280.0014	481.1726	677.1738	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3628.0714	
Space heating per m2											(98c) / (4) =	65.7617	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	690.6885	565.0813	496.9447	293.4026	143.6065	0.0000	0.0000	0.0000	0.0000	280.0014	481.1726	677.1738	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	822.2482	672.7158	591.6008	349.2888	170.9602	0.0000	0.0000	0.0000	0.0000	333.3350	572.8246	806.1593	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.7985	81.6754	81.3460	80.5644	79.0690	75.0000	75.0000	75.0000	75.0000	80.4331	81.3839	81.7841	(217)
Fuel for water heating, kWh/month	244.1301	215.1215	228.1213	200.7650	196.5169	184.6282	181.4441	190.4571	194.3068	204.0552	216.3221	241.4720	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.1426	11.3457	10.2156	7.4844	5.7811	4.7232	5.2737	6.8550	8.9040	11.6825	13.1954	14.5357	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4319.1326	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												75.0000	
Water heating fuel used												2497.3403	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												115.0000	(230c)
Total electricity for the above, kWh/year												115.0000	(231)
Electricity for lighting (calculated in Appendix L)												114.1389	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												7045.6118	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4319.1326	3.6400	157.2164	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2497.3403	3.6400	90.9032	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	114.1389	16.4900	18.8215	(250)
Additional standing charges			92.0000	(251)
Total energy cost			377.9046	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.3581	(257)
SAP value		77.9844	
SAP rating (Section 12)		78	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4319.1326	0.2100	907.0178	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2497.3403	0.2100	524.4415	(264)
Space and water heating			1431.4593	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.1389	0.1443	16.4738	(268)
Total CO2, kg/year			1463.8850	(272)
CO2 emissions per m2			26.5300	(273)
EI value			80.4172	
EI rating			80	(274)
EI band			C	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	166.0617	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8704	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8878	0.8693	0.8509	0.7769	0.7584	0.6844	0.6844	0.6844	0.6844	0.7769	0.7954	0.8324	(22b)
Effective ac	0.8941	0.8779	0.8620	0.8018	0.7876	0.7342	0.7342	0.7342	0.7342	0.8018	0.8163	0.8464	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			99.7500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.1200			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.9500	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	50.0700	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	48.9989	48.1084	47.2365	43.9367	43.1586	40.2338	40.2338	40.2338	40.2338	43.9367	44.7336	46.3835	(38)
Heat transfer coeff													
	99.0690	98.1784	97.3066	94.0068	93.2287	90.3039	90.3039	90.3039	90.3039	94.0068	94.8036	96.4535	(39)
Average = Sum(39)m / 12 =												94.0224	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7957	1.7796	1.7638	1.7039	1.6898	1.6368	1.6368	1.6368	1.6368	1.7039	1.7184	1.7483	(40)
HLP (average)												1.7042	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8423	(42)
Hot water usage for mixer showers													
	61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												87.5198	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	
Distribution loss (46)m = 0.15 x (45)m													
	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.6123	42.9191	46.2061	42.8359	42.6677	39.6381	40.3411	41.6473	41.6318	44.8081	45.2698	48.4914	(61)
Total heat required for water heating calculated for each month													
	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)
										Total per year (kWh/year) = Sum(64)m =		1978.8848	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	62.3880	54.8798	57.8892	50.2463	48.1451	42.7715	41.9195	44.0593	45.0206	50.8759	54.8024	61.6635	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.1575	14.3510	11.6710	8.8357	6.6048	5.5760	6.0251	7.8317	10.5116	13.3470	15.5779	16.6066	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	239.7368	242.2245	235.9555	222.6096	205.7628	189.9292	179.3514	176.8637	183.1327	196.4785	213.3253	229.1589	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	83.8548	81.6664	77.8080	69.7865	64.7111	59.4049	56.3434	59.2195	62.5287	68.3815	76.1144	82.8810	(72)
Total internal gains													
	431.4923	429.9851	417.1777	392.9750	368.8219	339.6533	326.4631	328.6580	340.9161	369.9502	396.7607	420.3897	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Northwest	2.3600	10.4150	0.7600	0.8000	0.7700	10.3564	(81)

Solar gains	33.8777	70.5554	133.1939	223.9924	295.5805	321.5215	291.6281	228.7156	164.0072	89.9130	43.3805	28.5446	(83)
Total gains	465.3700	500.5404	550.3716	616.9674	664.4024	661.1748	618.0912	557.3736	504.9233	459.8632	440.1412	448.9343	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.6725	39.0233	39.3730	40.7550	41.0952	42.4262	42.4262	42.4262	42.4262	40.7550	40.4125	39.7212	
alpha	3.5782	3.6016	3.6249	3.7170	3.7397	3.8284	3.8284	3.8284	3.8284	3.7170	3.6942	3.6481	
util living area													
	0.9917	0.9884	0.9788	0.9477	0.8700	0.7296	0.6156	0.6740	0.8671	0.9660	0.9872	0.9927	(86)
MIT	18.9949	19.1584	19.5096	20.0576	20.5383	20.8455	20.9378	20.9130	20.6693	20.0751	19.5116	19.0093	(87)
Th 2	19.4730	19.4843	19.4955	19.5380	19.5481	19.5864	19.5864	19.5864	19.5864	19.5380	19.5277	19.5064	(88)
util rest of house													
	0.9886	0.9841	0.9704	0.9255	0.8111	0.6124	0.4519	0.5090	0.7853	0.9472	0.9816	0.9901	(89)
MIT 2	17.7284	17.8984	18.2529	18.8139	19.2565	19.5215	19.5714	19.5631	19.4099	18.8404	18.2806	17.7661	(90)

Living area fraction										fLA = Living area / (4) =		0.3999	(91)
MIT	18.2348	18.4022	18.7554	19.3112	19.7690	20.0509	20.1177	20.1029	19.9135	19.3341	18.7728	18.2632	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.0848	18.2522	18.6054	19.1612	19.6190	19.9009	19.9677	19.9529	19.7635	19.1841	18.6228	18.1132	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9846	0.9791	0.9635	0.9180	0.8145	0.6416	0.4997	0.5566	0.7979	0.9409	0.9765	0.9865	(94)
Useful gains	458.1837	490.0753	530.2711	566.3967	541.1801	424.2168	308.8736	310.2363	402.8983	432.6905	429.8025	442.8641	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1326.0200	1281.4457	1158.4714	945.8226	710.3134	469.6649	322.1794	329.8705	511.4323	797.5638	1054.4844	1303.3959	(97)
Space heating kWh													
	645.6702	531.8009	467.3810	273.1867	125.8351	0.0000	0.0000	0.0000	0.0000	271.4658	449.7709	640.2357	(98a)
Space heating requirement - total per year (kWh/year)												3405.3463	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	645.6702	531.8009	467.3810	273.1867	125.8351	0.0000	0.0000	0.0000	0.0000	271.4658	449.7709	640.2357	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3405.3463	
Space heating per m2											(98c) / (4) =	61.7246	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	645.6702	531.8009	467.3810	273.1867	125.8351	0.0000	0.0000	0.0000	0.0000	271.4658	449.7709	640.2357	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	768.6550	633.0963	556.4060	325.2222	149.8037	0.0000	0.0000	0.0000	0.0000	323.1735	535.4416	762.1853	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.6845	81.5692	81.2297	80.4115	78.7768	75.0000	75.0000	75.0000	75.0000	80.3662	81.2570	81.6891	(217)
Fuel for water heating, kWh/month													
	244.4708	215.4016	228.4476	201.1467	197.2459	184.6282	181.4441	190.4571	194.3068	204.2250	216.6602	241.7529	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.1426	11.3457	10.2156	7.4844	5.7811	4.7232	5.2737	6.8550	8.9040	11.6825	13.1954	14.5357	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4053.9837	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												75.0000	
Water heating fuel used												2500.1868	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												115.0000	(230c)
Total electricity for the above, kWh/year												115.0000	(231)
Electricity for lighting (calculated in Appendix L)												114.1389	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												6783.3094	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4053.9837	5.6000	227.0231	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	2500.1868	5.6000	140.0105	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	114.1389	26.0600	29.7446	(250)
Additional standing charges			99.0000	(251)
Total energy cost			525.7471	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4053.9837	0.2100	851.3366	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2500.1868	0.2100	525.0392	(264)
Space and water heating			1376.3758	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.1389	0.1443	16.4738	(268)
Total CO2, kg/year			1408.8015	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4053.9837	1.1300	4581.0016	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2500.1868	1.1300	2825.2111	(278)
Space and water heating			7406.2127	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	114.1389	1.5338	175.0700	(282)
Total Primary energy kWh/year			7755.2547	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 6

Current energy efficiency rating: C 78
Current environmental impact rating: C 80

N Solar water heating — Not applicable
U Solar photovoltaic panels — Not applicable
V2 Wind turbine — Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures	Typical annual savings			Energy efficiency	Environmental impact
(none)					
Total Savings	£0	0.00 kg/m²			

Potential energy efficiency rating: C 78
Potential environmental impact rating: C 80

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£60	£60	£0
Mains gas	£466	£466	£0
Space heating	£356	£356	£0
Water heating	£140	£140	£0
Lighting	£30	£30	£0
Total cost of fuels	£526	£526	£0
Total cost of uses	£526	£526	£0
Delivered energy	123 kWh/m²	123 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.4 tonnes	1.4 tonnes	0.0 tonnes
CO2 emissions per m²	26 kg/m²	26 kg/m²	0 kg/m²
Primary energy	141 kWh/m²	141 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		55.1700 (1b)	x	3.0100 (2b)	=	166.0617	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	166.0617	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8704	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9433	0.9248	0.9063	0.8139	0.7954	0.7029	0.7029	0.6844	0.7399	0.7954	0.8324	0.8693	(22b)
Effective ac	0.9449	0.9277	0.9107	0.8312	0.8163	0.7470	0.7470	0.7342	0.7737	0.8163	0.8464	0.8779	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			99.7500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.1200			(33)
Party Floor 1			55.1700					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.9500	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	50.0700	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	51.7831	50.8363	49.9083	45.5491	44.7336	40.9369	40.9369	40.2338	42.3993	44.7336	46.3835	48.1084	(38)
Heat transfer coeff	101.8532	100.9064	99.9783	95.6192	94.8036	91.0069	91.0069	90.3039	92.4694	94.8036	96.4535	98.1784	(39)
Average = Sum(39)m / 12 =												95.6153	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8462	1.8290	1.8122	1.7332	1.7184	1.6496	1.6496	1.6368	1.6761	1.7184	1.7483	1.7796	(40)
HLP (average)												1.7331	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.8423	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)

Average daily hot water use (litres/day)	87.5198 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	

Distribution loss (46)m = 0.15 x (45)m

22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)

Water storage loss:

Total storage loss

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)

If cylinder contains dedicated solar storage

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 48.6123	42.9191	46.2061	42.8359	42.6677	39.6381	40.3411	41.6473	41.6318	44.8081	45.2698	48.4914	(61)

Total heat required for water heating calculated for each month

199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)

Total per year (kWh/year) = Sum(64)m =	1978.8848 (64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000 (64a)

Heat gains from water heating, kWh/month

62.3880	54.8798	57.8892	50.2463	48.1451	42.7715	41.9195	44.0593	45.0206	50.8759	54.8024	61.6635	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.1575	14.3510	11.6710	8.8357	6.6048	5.5760	6.0251	7.8317	10.5116	13.3470	15.5779	16.6066	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	239.7368	242.2245	235.9555	222.6096	205.7628	189.9292	179.3514	176.8637	183.1327	196.4785	213.3253	229.1589	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	83.8548	81.6664	77.8080	69.7865	64.7111	59.4049	56.3434	59.2195	62.5287	68.3815	76.1144	82.8810	(72)
Total internal gains													
	431.4923	429.9851	417.1777	392.9750	368.8219	339.6533	326.4631	328.6580	340.9161	369.9502	396.7607	420.3897	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Northwest	2.3600	11.2829	0.7600	0.8000	0.7700	11.2194	(81)

Solar gains	36.7009	74.7057	134.5959	221.0451	297.1280	316.7699	296.3318	236.2391	164.0072	91.2963	46.1792	29.9718	(83)
Total gains	468.1932	504.6908	551.7736	614.0201	665.9499	656.4233	622.7948	564.8972	504.9233	461.2465	442.9399	450.3615	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6154	37.9684	38.3208	40.0678	40.4125	42.0984	42.0984	42.4262	41.4326	40.4125	39.7212	39.0233	
alpha	3.5077	3.5312	3.5547	3.6712	3.6942	3.8066	3.8066	3.8284	3.7622	3.6942	3.6481	3.6016	
util living area													
	0.9921	0.9888	0.9798	0.9516	0.8815	0.7422	0.5944	0.6578	0.8712	0.9669	0.9882	0.9932	(86)
MIT	18.8679	19.0538	19.4237	19.9941	20.4812	20.8304	20.9462	20.9218	20.6487	20.0492	19.4178	18.9046	(87)
Th 2	19.4379	19.4498	19.4615	19.5172	19.5277	19.5772	19.5772	19.5864	19.5580	19.5277	19.5064	19.4843	(88)
util rest of house													
	0.9893	0.9848	0.9718	0.9310	0.8274	0.6274	0.4245	0.4897	0.7898	0.9487	0.9831	0.9908	(89)
MIT 2	17.5779	17.7705	18.1443	18.7381	19.1912	19.5040	19.5655	19.5666	19.3703	18.8079	18.1727	17.6464	(90)
Living area fraction									fLA = Living area / (4) =			0.3999	(91)
MIT	18.0937	18.2836	18.6559	19.2403	19.7070	20.0343	20.1176	20.1085	19.8814	19.3043	18.6706	18.1495	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9437	18.1336	18.5059	19.0903	19.5570	19.8843	19.9676	19.9585	19.7314	19.1543	18.5206	17.9995	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9853	0.9797	0.9649	0.9232	0.8287	0.6554	0.4747	0.5386	0.8020	0.9423	0.9781	0.9873	(94)
Useful gains	461.3081	494.4583	532.3945	566.8875	551.8518	430.2035	295.6438	304.2412	404.9568	434.6290	433.2593	444.6319	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1389.6528	1335.3531	1200.3309	974.3911	744.8714	480.9108	306.4717	321.3463	520.7364	810.9749	1101.5546	1354.8117	(97)
Space heating kWh													
	690.6885	565.0813	496.9447	293.4026	143.6065	0.0000	0.0000	0.0000	0.0000	280.0014	481.1726	677.1738	(98a)
Space heating requirement - total per year (kWh/year)												3628.0714	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	690.6885	565.0813	496.9447	293.4026	143.6065	0.0000	0.0000	0.0000	0.0000	280.0014	481.1726	677.1738	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3628.0714	
Space heating per m2											(98c) / (4) =	65.7617	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	690.6885	565.0813	496.9447	293.4026	143.6065	0.0000	0.0000	0.0000	0.0000	280.0014	481.1726	677.1738	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	822.2482	672.7158	591.6008	349.2888	170.9602	0.0000	0.0000	0.0000	0.0000	333.3350	572.8246	806.1593	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)

Water heating

Water heating requirement

	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.7985	81.6754	81.3460	80.5644	79.0690	75.0000	75.0000	75.0000	75.0000	80.4331	81.3839	81.7841	(217)
Fuel for water heating, kWh/month													
	244.1301	215.1215	228.1213	200.7650	196.5169	184.6282	181.4441	190.4571	194.3068	204.0552	216.3221	241.4720	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.1426	11.3457	10.2156	7.4844	5.7811	4.7232	5.2737	6.8550	8.9040	11.6825	13.1954	14.5357	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4319.1326	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2497.3403	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	114.1389	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7045.6118	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4319.1326	3.6400	157.2164	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2497.3403	3.6400	90.9032	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	114.1389	16.4900	18.8215	(250)
Additional standing charges			92.0000	(251)
Total energy cost			377.9046	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.3581	(257)
SAP value		77.9844	
SAP rating (Section 12)		78	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4319.1326	0.2100	907.0178	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2497.3403	0.2100	524.4415	(264)
Space and water heating			1431.4593	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.1389	0.1443	16.4738	(268)
Total CO2, kg/year			1463.8850	(272)
CO2 emissions per m2			26.5300	(273)
EI value			80.4172	
EI rating			80	(274)
EI band			C	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	55.1700	(1b)	x 3.0100	(2b) =	166.0617	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.1700					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		166.0617	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1204 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8704 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7399 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8878	0.8693	0.8509	0.7769	0.7584	0.6844	0.6844	0.6844	0.6844	0.7769	0.7954	0.8324	(22b)
Effective ac	0.8941	0.8779	0.8620	0.8018	0.7876	0.7342	0.7342	0.7342	0.7342	0.8018	0.8163	0.8464	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			7.7200	1.3258	10.2348			(27)
External Wall 1	44.5800	7.7200	36.8600	0.3000	11.0580			(29a)
External Roof 1	55.1700		55.1700	0.1600	8.8272			(30)
Total net area of external elements Aum(A, m2)			99.7500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.1200			(33)
Party Floor 1			55.1700					(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							19.9500	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		50.0700	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	48.9989	48.1084	47.2365	43.9367	43.1586	40.2338	40.2338	40.2338	40.2338	43.9367	44.7336	46.3835	(38)
Heat transfer coeff	99.0690	98.1784	97.3066	94.0068	93.2287	90.3039	90.3039	90.3039	90.3039	94.0068	94.8036	96.4535	(39)
Average = Sum(39)m / 12 =												94.0224	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7957	1.7796	1.7638	1.7039	1.6898	1.6368	1.6368	1.6368	1.6368	1.7039	1.7184	1.7483	(40)
HLP (average)												1.7042	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8423	(42)
Hot water usage for mixer showers	61.8977	60.9675	59.6120	57.0185	55.1046	52.9702	51.7570	53.1023	54.5769	56.8686	59.5177	61.6605	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	33.4974	32.2793	31.0612	29.8431	28.6250	27.4070	27.4070	28.6250	29.8431	31.0612	32.2793	33.4974	(42c)
Average daily hot water use (litres/day)												87.5198	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	95.3951	93.2468	90.6732	86.8617	83.7296	80.3772	79.1640	81.7273	84.4200	87.9298	91.7970	95.1579	(44)
Energy conte	151.0825	132.7822	139.3614	118.9093	112.7162	98.8331	95.7420	101.1955	104.0983	119.3199	130.7817	148.9943	(45)
Energy content (annual)										Total = Sum(45)m =		1453.8163	
Distribution loss (46)m = 0.15 x (45)m	22.6624	19.9173	20.9042	17.8364	16.9074	14.8250	14.3613	15.1793	15.6147	17.8980	19.6173	22.3491	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	48.6123	42.9191	46.2061	42.8359	42.6677	39.6381	40.3411	41.6473	41.6318	44.8081	45.2698	48.4914	(61)
Total heat required for water heating calculated for each month	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													

	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858	(64)
									Total per year (kWh/year) = Sum(64)m =			1978.8848	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
	62.3880	54.8798	57.8892	50.2463	48.1451	42.7715	41.9195	44.0593	45.0206	50.8759	54.8024	61.6635	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	110.5403	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.1575	14.3510	11.6710	8.8357	6.6048	5.5760	6.0251	7.8317	10.5116	13.3470	15.5779	16.6066	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	239.7368	242.2245	235.9555	222.6096	205.7628	189.9292	179.3514	176.8637	183.1327	196.4785	213.3253	229.1589	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	47.8964	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	-73.6936	(71)
Water heating gains (Table 5)													
	83.8548	81.6664	77.8080	69.7865	64.7111	59.4049	56.3434	59.2195	62.5287	68.3815	76.1144	82.8810	(72)
Total internal gains													
	431.4923	429.9851	417.1777	392.9750	368.8219	339.6533	326.4631	328.6580	340.9161	369.9502	396.7607	420.3897	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Northwest	2.3600	10.4150	0.7600	0.8000	0.7700	10.3564	(81)

Solar gains	33.8777	70.5554	133.1939	223.9924	295.5805	321.5215	291.6281	228.7156	164.0072	89.9130	43.3805	28.5446	(83)
Total gains	465.3700	500.5404	550.3716	616.9674	664.4024	661.1748	618.0912	557.3736	504.9233	459.8632	440.1412	448.9343	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.6725	39.0233	39.3730	40.7550	41.0952	42.4262	42.4262	42.4262	42.4262	40.7550	40.4125	39.7212	
alpha	3.5782	3.6016	3.6249	3.7170	3.7397	3.8284	3.8284	3.8284	3.8284	3.7170	3.6942	3.6481	
util living area													
	0.9917	0.9884	0.9788	0.9477	0.8700	0.7296	0.6156	0.6740	0.8671	0.9660	0.9872	0.9927	(86)
MIT	18.9949	19.1584	19.5096	20.0576	20.5383	20.8455	20.9378	20.9130	20.6693	20.0751	19.5116	19.0093	(87)
Th 2	19.4730	19.4843	19.4955	19.5380	19.5481	19.5864	19.5864	19.5864	19.5864	19.5380	19.5277	19.5064	(88)
util rest of house													
	0.9886	0.9841	0.9704	0.9255	0.8111	0.6124	0.4519	0.5090	0.7853	0.9472	0.9816	0.9901	(89)
MIT 2	17.7284	17.8984	18.2529	18.8139	19.2565	19.5215	19.5714	19.5631	19.4099	18.8404	18.2806	17.7661	(90)
Living area fraction									fLA = Living area / (4) =			0.3999	(91)
MIT	18.2348	18.4022	18.7554	19.3112	19.7690	20.0509	20.1177	20.1029	19.9135	19.3341	18.7728	18.2632	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.0848	18.2522	18.6054	19.1612	19.6190	19.9009	19.9677	19.9529	19.7635	19.1841	18.6228	18.1132	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9846	0.9791	0.9635	0.9180	0.8145	0.6416	0.4997	0.5566	0.7979	0.9409	0.9765	0.9865	(94)
Useful gains	458.1837	490.0753	530.2711	566.3967	541.1801	424.2168	308.8736	310.2363	402.8983	432.6905	429.8025	442.8641	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1326.0200	1281.4457	1158.4714	945.8226	710.3134	469.6649	322.1794	329.8705	511.4323	797.5638	1054.4844	1303.3959	(97)
Space heating kWh													
	645.6702	531.8009	467.3810	273.1867	125.8351	0.0000	0.0000	0.0000	0.0000	271.4658	449.7709	640.2357	(98a)
Space heating requirement - total per year (kWh/year)												3405.3463	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	645.6702	531.8009	467.3810	273.1867	125.8351	0.0000	0.0000	0.0000	0.0000	271.4658	449.7709	640.2357	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3405.3463	
Space heating per m2											(98c) / (4) =	61.7246	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	645.6702	531.8009	467.3810	273.1867	125.8351	0.0000	0.0000	0.0000	0.0000	271.4658	449.7709	640.2357	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	768.6550	633.0963	556.4060	325.2222	149.8037	0.0000	0.0000	0.0000	0.0000	323.1735	535.4416	762.1853	(211)
Space heating efficiency (main heating system 2)													

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating												
Water heating requirement												
	199.6948	175.7013	185.5674	161.7451	155.3839	138.4712	136.0831	142.8428	145.7301	164.1279	176.0515	197.4858 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.6845	81.5692	81.2297	80.4115	78.7768	75.0000	75.0000	75.0000	75.0000	80.3662	81.2570	81.6891 (217)
Fuel for water heating, kWh/month												
	244.4708	215.4016	228.4476	201.1467	197.2459	184.6282	181.4441	190.4571	194.3068	204.2250	216.6602	241.7529 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	14.1426	11.3457	10.2156	7.4844	5.7811	4.7232	5.2737	6.8550	8.9040	11.6825	13.1954	14.5357 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4053.9837	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2500.1868	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	114.1389	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6783.3094	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4053.9837	5.6000	227.0231	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2500.1868	5.6000	140.0105	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	114.1389	26.0600	29.7446	(250)
Additional standing charges			99.0000	(251)
Total energy cost			525.7471	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4053.9837	0.2100	851.3366	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2500.1868	0.2100	525.0392	(264)
Space and water heating			1376.3758	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	114.1389	0.1443	16.4738	(268)
Total CO2, kg/year			1408.8015	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4053.9837	1.1300	4581.0016	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2500.1868	1.1300	2825.2111	(278)
Space and water heating			7406.2127	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	114.1389	1.5338	175.0700	(282)
Total Primary energy kWh/year			7755.2547	(286)

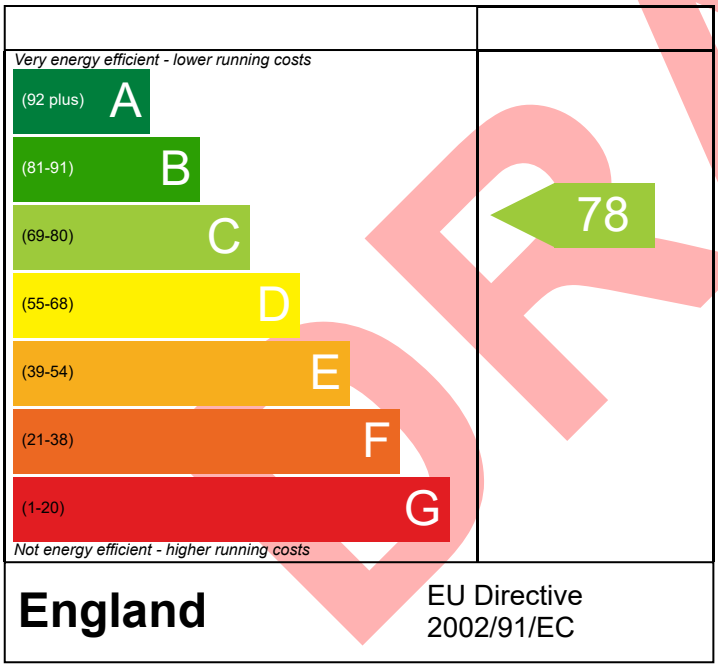
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	55.17 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

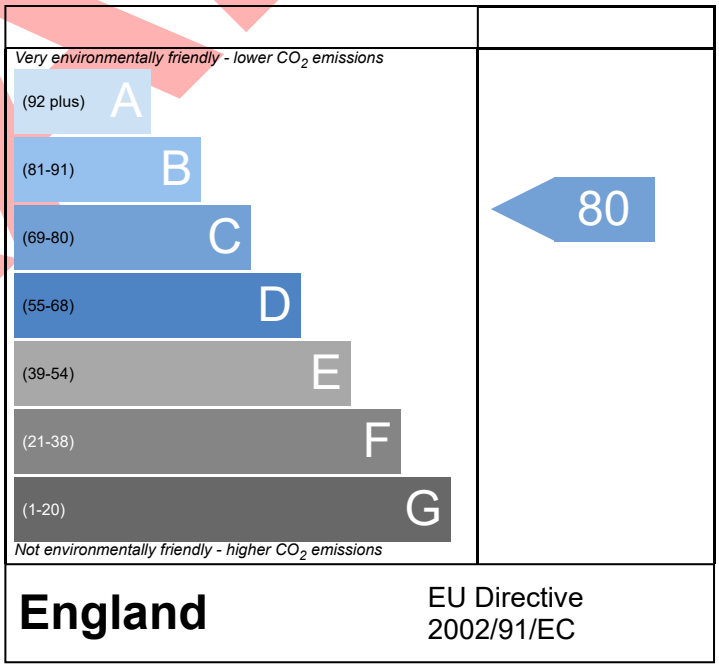
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

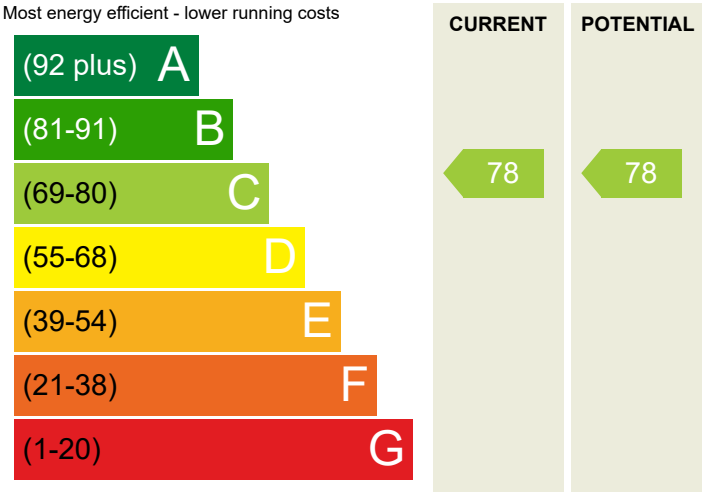
Energy Report

Dwelling Address	
Reference	Apt. 6-Apt. 6
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	55

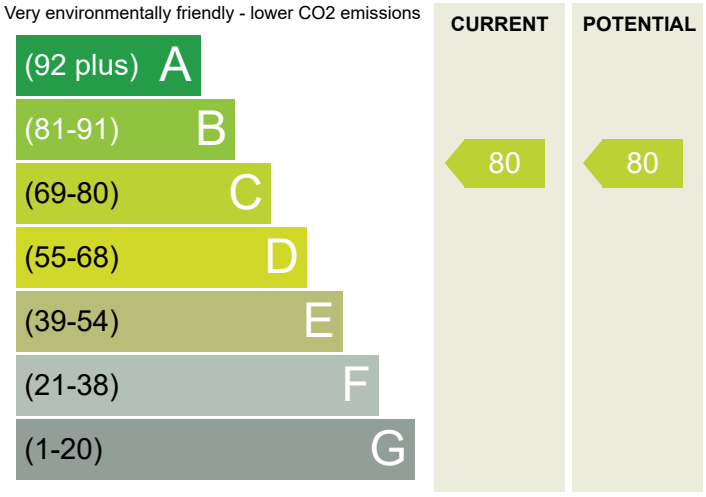
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

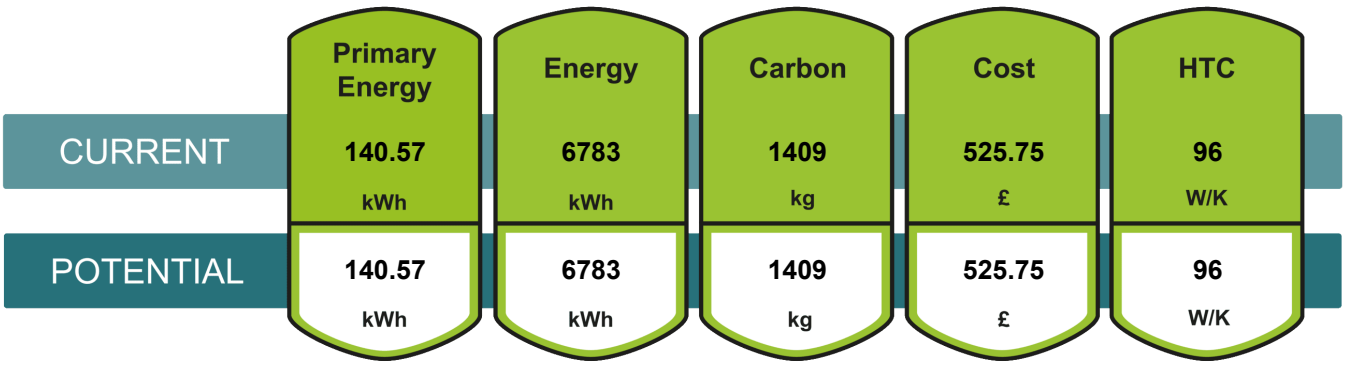
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£30	£30	
Heating	£356	£356	
Hot Water	£140	£140	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£526	£526	

Estimated energy use and potential savings

Space Heating
4054
kWh per year

Water Heating
2500
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 6	Issued on Date	01/10/2024
Assessment Reference	Apt. 6	Prop Type Ref	Detached Flat
Property			

SAP Rating	78 C	DER	27.17	TER	
Environmental	80 C	% DER < TER			N/A
CO_2 Emissions (t/year)	1.41	DFEE	74.23	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	149.37	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Southwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1	
Type	Solid Wall	
Construction	Other	
U-value	0.30	W/m²K U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	44.58	m²

Comments

External Roofs

Dwelling Sign Off Report

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	55.17	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NE1	New Glazing	External Wall 1	North East	5.36
W NW1	New Glazing	External Wall 1	North West	2.36

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1

SAP table

Fuel Type	Mains gas	
Winter Efficiency	84.00	%
Summer Efficiency	75.00	%
Model Name		
Manufacturer		
System Type		
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Flow Temperature Value		

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2 None

Secondary Heating None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Dwelling Sign Off Report

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 7	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 7	**Prop Type Ref**	
Property			

SAP Rating	80 C	**DER**	23.83	**TER**	
Environmental	83 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.18	**DFEE**	59.33	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	131.61	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	12.07 m	52.55 m²	3.01 m

8.0 Living Area	22.54	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	20.38	15.02	0.00	None	5.36	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	52.56	52.56	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	52.56

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NE1	New Glazing	External Wall 1	North East	5.36	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

Summary for Input Data

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None	
28.0 Water Heating		
Water Heating	Main Heating 1	
SAP Code	901	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
Immersion Heater	Single	
Summer Immersion	No	
Cold Water Source	From mains	
Bath Count	0	
Supplementary Immersion	No	
Immersion Only Heating Hot Water	No	

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	
34.0 Small-scale Hydro	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 7	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 7	**Prop Type Ref**	
Property			

SAP Rating	80 C	**DER**	23.83	**TER**	
Environmental	83 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.18	**DFEE**	59.33	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	131.61	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.1755	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8764 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8660	0.8491	0.8321	0.7472	0.7302	0.6453	0.6453	0.6283	0.6792	0.7302	0.7641	0.7981	(22b)
Effective ac	0.8750	0.8604	0.8462	0.7791	0.7666	0.7082	0.7082	0.6974	0.7307	0.7666	0.7920	0.8185	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			72.9400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		20.0217			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	14.5880	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	34.6097	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.6736	44.9135	44.1684	40.6689	40.0142	36.9662	36.9662	36.4018	38.1402	40.0142	41.3387	42.7235	(38)
Heat transfer coeff	80.2832	79.5231	78.7781	75.2786	74.6238	71.5759	71.5759	71.0114	72.7499	74.6238	75.9484	77.3331	(39)
Average = Sum(39)m / 12 =												75.2754	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.5277	1.5133	1.4991	1.4325	1.4201	1.3621	1.3621	1.3513	1.3844	1.4201	1.4453	1.4716	(40)
HLP (average)												1.4325	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7653	(42)
Hot water usage for mixer showers													
	60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)
Average daily hot water use (litres/day)												85.4593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)										Total = Sum(45)m =		1419.5892	
Distribution loss (46)m = 0.15 x (45)m													
	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.4678	41.9086	45.1183	41.8274	41.6632	38.7049	39.3914	40.6668	40.6516	43.7531	44.2040	47.3498	(61)
Total heat required for water heating calculated for each month													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
										Total per year (kWh/year) = Sum(64)m =		1932.2961	(64)
12Total per year (kWh/year)												1932	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	60.9192	53.5878	56.5263	49.0634	47.0116	41.7646	40.9326	43.0220	43.9607	49.6781	53.5122	60.2117	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	86.6878	95.9758	86.6878	89.5774	86.6878	89.5774	86.6878	86.6878	89.5774	86.6878	89.5774	86.6878	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	153.8520	155.4485	151.4253	142.8606	132.0491	121.8878	115.0994	113.5029	117.5261	126.0908	136.9023	147.0636	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	81.8806	79.7438	75.9762	68.1436	63.1876	58.0063	55.0169	57.8253	61.0565	66.7716	74.3224	80.9297	(72)
Total internal gains													
	378.8998	387.6474	370.5687	357.0609	338.4039	318.9509	306.2835	307.4954	317.6394	336.0297	357.2816	371.1605	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)

Solar gains	25.4814	51.8682	93.4500	153.4718	206.2962	219.9335	205.7433	164.0210	113.8703	63.3871	32.0622	20.8094	(83)
Total gains	404.3812	439.5156	464.0187	510.5327	544.7000	538.8844	512.0268	471.5164	431.5097	399.4167	389.3438	391.9700	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.4554	45.8899	46.3239	48.4773	48.9027	50.9851	50.9851	51.3904	50.1623	48.9027	48.0498	47.1894	
alpha	4.0304	4.0593	4.0883	4.2318	4.2602	4.3990	4.3990	4.4260	4.3442	4.2602	4.2033	4.1460	
util living area													
	0.9944	0.9914	0.9849	0.9601	0.8936	0.7433	0.5850	0.6442	0.8688	0.9705	0.9904	0.9951	(86)
MIT	19.2086	19.3841	19.6857	20.1838	20.5970	20.8870	20.9697	20.9550	20.7513	20.2447	19.7029	19.2481	(87)
Th 2	19.6668	19.6776	19.6882	19.7385	19.7480	19.7925	19.7925	19.8009	19.7753	19.7480	19.7288	19.7089	(88)
util rest of house													
	0.9925	0.9884	0.9791	0.9437	0.8472	0.6414	0.4391	0.4989	0.7945	0.9550	0.9864	0.9935	(89)
MIT 2	18.0781	18.2603	18.5669	19.0903	19.4776	19.7415	19.7853	19.7885	19.6383	19.1624	18.6156	18.1481	(90)
Living area fraction										fLA = Living area / (4) =		0.4289	(91)
MIT	18.5630	18.7423	19.0468	19.5593	19.9577	20.2328	20.2933	20.2888	20.1157	19.6266	19.0819	18.6199	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.4130	18.5923	18.8968	19.4093	19.8077	20.0828	20.1433	20.1388	19.9657	19.4766	18.9319	18.4699	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9898	0.9848	0.9744	0.9382	0.8499	0.6684	0.4837	0.5428	0.8083	0.9505	0.9829	0.9911	(94)
Useful gains	400.2686	432.8544	452.1255	478.9710	462.9151	360.1861	247.6624	255.9469	348.7999	379.6586	382.6984	388.4942	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1133.0378	1088.8530	976.5964	791.1273	605.0295	392.4366	253.6176	265.5004	426.7299	662.4065	898.6173	1103.5354	(97)
Space heating kWh	545.1803	440.8311	390.2063	224.7526	105.7331	0.0000	0.0000	0.0000	0.0000	210.3645	371.4616	531.9906	(98a)
Space heating requirement - total per year (kWh/year)												2820.5200	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	545.1803	440.8311	390.2063	224.7526	105.7331	0.0000	0.0000	0.0000	0.0000	210.3645	371.4616	531.9906	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2820.5200	
Space heating per m2											(98c) / (4) =	53.6731	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	545.1803	440.8311	390.2063	224.7526	105.7331	0.0000	0.0000	0.0000	0.0000	210.3645	371.4616	531.9906	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	649.0241	524.7989	464.5313	267.5626	125.8727	0.0000	0.0000	0.0000	0.0000	250.4339	442.2161	633.3222	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.4259	81.2679	80.9207	80.0363	78.4520	75.0000	75.0000	75.0000	75.0000	79.8563	80.9276	81.4012	(217)
Fuel for water heating, kWh/month	239.4735	211.1101	223.9213	197.3321	193.3994	180.2815	177.1724	185.9731	189.7322	200.6903	212.4204	236.8961	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.6406	11.7452	10.5753	7.7479	5.9847	4.8896	5.4594	7.0964	9.2175	12.0939	13.6600	15.0475	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3357.7619	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2448.4023	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	118.1580	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6039.3222	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3357.7619	0.2100	705.1300	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2448.4023	0.2100	514.1645	(264)
Space and water heating			1219.2945	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	118.1580	0.1443	17.0539	(268)
Total CO2, kg/year			1252.3003	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			23.8300	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3357.7619	1.1300	3794.2709	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2448.4023	1.1300	2766.6947	(278)
Space and water heating			6560.9655	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	118.1580	1.5338	181.2348	(282)
Total Primary energy kWh/year			6916.1723	(286)
Dwelling Primary energy Rate (DPER)			131.6100	(287)

Full SAP Calculation Printout

elmhurst energy

Property Reference	Apt. 7	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 7	**Prop Type Ref**	
Property			

SAP Rating	80 C	**DER**	23.83	**TER**	
Environmental	83 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.18	**DFEE**	59.33	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	131.61	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.1755	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8764 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8660	0.8491	0.8321	0.7472	0.7302	0.6453	0.6453	0.6283	0.6792	0.7302	0.7641	0.7981	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.8750	0.8604	0.8462	0.7791	0.7666	0.7082	0.7082	0.6974	0.7307	0.7666	0.7920	0.8185	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			72.9400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		20.0217			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		14.5880 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	34.6097 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.6736	44.9135	44.1684	40.6689	40.0142	36.9662	36.9662	36.4018	38.1402	40.0142	41.3387	42.7235	(38)
Heat transfer coeff	80.2832	79.5231	78.7781	75.2786	74.6238	71.5759	71.5759	71.0114	72.7499	74.6238	75.9484	77.3331	(39)
Average = Sum(39)m / 12 =												75.2754	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5277	1.5133	1.4991	1.4325	1.4201	1.3621	1.3621	1.3513	1.3844	1.4201	1.4453	1.4716	(40)
HLP (average)												1.4325	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7653	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	23.2666	22.9211	22.4345	21.5373	20.8655	20.1205	19.7182	20.2013	20.7275	21.5246	22.4402	23.1879	(42b)
Hot water usage for other uses													
	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)
Average daily hot water use (litres/day)												51.3067	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	55.9750	54.4400	52.7640	50.6775	48.8163	46.8819	46.4796	48.1521	49.8676	51.8541	53.9592	55.8963	(44)
Energy conte	88.6507	77.5219	81.0964	69.3749	65.7161	57.6468	56.2130	59.6224	61.4918	70.3656	76.8748	87.5201	(45)
Energy content (annual)										Total = Sum(45)m =		852.0944	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	75.3531	65.8936	68.9319	58.9687	55.8587	48.9998	47.7810	50.6791	52.2680	59.8107	65.3436	74.3921	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	75.3531	65.8936	68.9319	58.9687	55.8587	48.9998	47.7810	50.6791	52.2680	59.8107	65.3436	74.3921	(64)
										Total per year (kWh/year) = Sum(64)m =		724.2802	(64)
12Total per year (kWh/year)												724	(64)
Electric shower(s)													
	43.0990	38.4016	41.9330	40.0162	40.7671	38.8878	40.1841	40.7671	40.0162	41.9330	41.1445	43.0990	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												490.2486	(64a)
Heat gains from water heating, kWh/month													
	29.6130	26.0738	27.7162	24.7462	24.1564	21.9719	21.9913	22.8615	23.0711	25.4359	26.6220	29.3728	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	86.6878	95.9758	86.6878	89.5774	86.6878	89.5774	86.6878	86.6878	89.5774	86.6878	89.5774	86.6878	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	153.8520	155.4485	151.4253	142.8606	132.0491	121.8878	115.0994	113.5029	117.5261	126.0908	136.9023	147.0636	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	39.8024	38.8003	37.2530	34.3697	32.4683	30.5165	29.5582	30.7279	32.0431	34.1881	36.9750	39.4795	(72)
Total internal gains													
	329.8216	339.7039	324.8455	316.2871	300.6846	291.4611	280.8248	280.3980	288.6260	296.4461	312.9342	322.7103	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)

Solar gains	25.4814	51.8682	93.4500	153.4718	206.2962	219.9335	205.7433	164.0210	113.8703	63.3871	32.0622	20.8094	(83)
Total gains	355.3030	391.5721	418.2955	469.7588	506.9807	511.3946	486.5681	444.4189	402.4963	359.8332	344.9964	343.5198	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.4554	45.8899	46.3239	48.4773	48.9027	50.9851	50.9851	51.3904	50.1623	48.9027	48.0498	47.1894	
alpha	4.0304	4.0593	4.0883	4.2318	4.2602	4.3990	4.3990	4.4260	4.3442	4.2602	4.2033	4.1460	
util living area													
	0.9965	0.9943	0.9895	0.9697	0.9125	0.7674	0.6100	0.6736	0.8904	0.9793	0.9939	0.9970	(86)
MIT	19.1169	19.2953	19.6030	20.1166	20.5501	20.8710	20.9644	20.9463	20.7191	20.1762	19.6202	19.1564	(87)
Th 2	19.6668	19.6776	19.6882	19.7385	19.7480	19.7925	19.7925	19.8009	19.7753	19.7480	19.7288	19.7089	(88)
util rest of house													
	0.9953	0.9923	0.9854	0.9566	0.8716	0.6674	0.4605	0.5261	0.8231	0.9680	0.9913	0.9960	(89)
MIT 2	17.9871	18.1725	18.4861	19.0274	19.4395	19.7329	19.7838	19.7857	19.6157	19.0979	18.5341	18.0570	(90)
Living area fraction										fLA = Living area / (4) =		0.4289	(91)
MIT	18.4717	18.6541	18.9652	19.4945	19.9159	20.2211	20.2902	20.2835	20.0890	19.5604	18.9999	18.5286	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.4717	18.6541	18.9652	19.4945	19.9159	20.2211	20.2902	20.2835	20.0890	19.5604	18.9999	18.5286	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9937	0.9900	0.9822	0.9533	0.8781	0.7063	0.5253	0.5897	0.8436	0.9657	0.9891	0.9946	(94)
Useful gains	353.0534	387.6652	410.8668	447.8294	445.1945	361.1944	255.5980	262.0847	339.5477	347.4969	341.2478	341.6699	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1137.7467	1093.7697	981.9808	797.5422	613.0990	402.3338	264.1302	275.7741	435.6970	668.6630	903.7811	1108.0732	(97)
Space heating kWh													
	583.8119	474.5022	424.9088	251.7932	124.9209	0.0000	0.0000	0.0000	0.0000	238.9475	405.0239	570.2040	(98a)
Space heating requirement - total per year (kWh/year)												3074.1124	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	583.8119	474.5022	424.9088	251.7932	124.9209	0.0000	0.0000	0.0000	0.0000	238.9475	405.0239	570.2040	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3074.1124	
Space heating per m2											(98c) / (4) =	58.4988	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	672.8132	529.6615	539.6869	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7331	0.8171	0.7698	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	493.2478	432.7828	415.4650	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	559.7516	532.6862	485.1640	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	47.8827	74.3282	51.8561	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction											fC = cooled area / (4) =	1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	11.9707	18.5820	12.9640	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												43.5167	(107)
Energy for space heating												58.4988	(99)
Energy for space cooling												0.8281	(108)
Total												59.3269	(109)
Fabric Energy Efficiency (DFEE)												59.3	(109)

Full SAP Calculation Printout

Property Reference	Apt. 7	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 7	**Prop Type Ref**	
Property			

SAP Rating	80 C	**DER**	23.83	**TER**	
Environmental	83 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.18	**DFEE**	59.33	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	131.61	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	158.1755	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8764 (18)
Number of sides sheltered		3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8660	0.8491	0.8321	0.7472	0.7302	0.6453	0.6453	0.6283	0.6792	0.7302	0.7641	0.7981	(22b)
Effective ac	0.8750	0.8604	0.8462	0.7791	0.7666	0.7082	0.7082	0.6974	0.7307	0.7666	0.7920	0.8185	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			72.9400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		20.0217			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	14.5880	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	34.6097	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.6736	44.9135	44.1684	40.6689	40.0142	36.9662	36.9662	36.4018	38.1402	40.0142	41.3387	42.7235	(38)
Heat transfer coeff	80.2832	79.5231	78.7781	75.2786	74.6238	71.5759	71.5759	71.0114	72.7499	74.6238	75.9484	77.3331	(39)
Average = Sum(39)m / 12 =												75.2754	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.5277	1.5133	1.4991	1.4325	1.4201	1.3621	1.3621	1.3513	1.3844	1.4201	1.4453	1.4716	(40)
HLP (average)												1.4325	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7653	(42)
Hot water usage for mixer showers													
	60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)
Average daily hot water use (litres/day)												85.4593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)										Total = Sum(45)m =		1419.5892	
Distribution loss (46)m = 0.15 x (45)m													
	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.4678	41.9086	45.1183	41.8274	41.6632	38.7049	39.3914	40.6668	40.6516	43.7531	44.2040	47.3498	(61)
Total heat required for water heating calculated for each month													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
										Total per year (kWh/year) = Sum(64)m =		1932.2961	(64)
12Total per year (kWh/year)												1932	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	60.9192	53.5878	56.5263	49.0634	47.0116	41.7646	40.9326	43.0220	43.9607	49.6781	53.5122	60.2117	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	88.2647	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	86.6878	95.9758	86.6878	89.5774	86.6878	89.5774	86.6878	86.6878	89.5774	86.6878	89.5774	86.6878	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	153.8520	155.4485	151.4253	142.8606	132.0491	121.8878	115.0994	113.5029	117.5261	126.0908	136.9023	147.0636	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	31.8265	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	81.8806	79.7438	75.9762	68.1436	63.1876	58.0063	55.0169	57.8253	61.0565	66.7716	74.3224	80.9297	(72)
Total internal gains													
	378.8998	387.6474	370.5687	357.0609	338.4039	318.9509	306.2835	307.4954	317.6394	336.0297	357.2816	371.1605	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)

Solar gains	25.4814	51.8682	93.4500	153.4718	206.2962	219.9335	205.7433	164.0210	113.8703	63.3871	32.0622	20.8094	(83)
Total gains	404.3812	439.5156	464.0187	510.5327	544.7000	538.8844	512.0268	471.5164	431.5097	399.4167	389.3438	391.9700	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.4554	45.8899	46.3239	48.4773	48.9027	50.9851	50.9851	51.3904	50.1623	48.9027	48.0498	47.1894	
alpha	4.0304	4.0593	4.0883	4.2318	4.2602	4.3990	4.3990	4.4260	4.3442	4.2602	4.2033	4.1460	
util living area													
	0.9944	0.9914	0.9849	0.9601	0.8936	0.7433	0.5850	0.6442	0.8688	0.9705	0.9904	0.9951	(86)
MIT	19.2086	19.3841	19.6857	20.1838	20.5970	20.8870	20.9697	20.9550	20.7513	20.2447	19.7029	19.2481	(87)
Th 2	19.6668	19.6776	19.6882	19.7385	19.7480	19.7925	19.7925	19.8009	19.7753	19.7480	19.7288	19.7089	(88)
util rest of house													
	0.9925	0.9884	0.9791	0.9437	0.8472	0.6414	0.4391	0.4989	0.7945	0.9550	0.9864	0.9935	(89)
MIT 2	18.0781	18.2603	18.5669	19.0903	19.4776	19.7415	19.7853	19.7885	19.6383	19.1624	18.6156	18.1481	(90)
Living area fraction										fLA = Living area / (4) =		0.4289	(91)
MIT	18.5630	18.7423	19.0468	19.5593	19.9577	20.2328	20.2933	20.2888	20.1157	19.6266	19.0819	18.6199	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.4130	18.5923	18.8968	19.4093	19.8077	20.0828	20.1433	20.1388	19.9657	19.4766	18.9319	18.4699	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9898	0.9848	0.9744	0.9382	0.8499	0.6684	0.4837	0.5428	0.8083	0.9505	0.9829	0.9911	(94)
Useful gains	400.2686	432.8544	452.1255	478.9710	462.9151	360.1861	247.6624	255.9469	348.7999	379.6586	382.6984	388.4942	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1133.0378	1088.8530	976.5964	791.1273	605.0295	392.4366	253.6176	265.5004	426.7299	662.4065	898.6173	1103.5354	(97)
Space heating kWh	545.1803	440.8311	390.2063	224.7526	105.7331	0.0000	0.0000	0.0000	0.0000	210.3645	371.4616	531.9906	(98a)
Space heating requirement - total per year (kWh/year)												2820.5200	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	545.1803	440.8311	390.2063	224.7526	105.7331	0.0000	0.0000	0.0000	0.0000	210.3645	371.4616	531.9906	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2820.5200	
Space heating per m2											(98c) / (4) =	53.6731	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	545.1803	440.8311	390.2063	224.7526	105.7331	0.0000	0.0000	0.0000	0.0000	210.3645	371.4616	531.9906	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	649.0241	524.7989	464.5313	267.5626	125.8727	0.0000	0.0000	0.0000	0.0000	250.4339	442.2161	633.3222	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.4259	81.2679	80.9207	80.0363	78.4520	75.0000	75.0000	75.0000	75.0000	79.8563	80.9276	81.4012	(217)
Fuel for water heating, kWh/month	239.4735	211.1101	223.9213	197.3321	193.3994	180.2815	177.1724	185.9731	189.7322	200.6903	212.4204	236.8961	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.6406	11.7452	10.5753	7.7479	5.9847	4.8896	5.4594	7.0964	9.2175	12.0939	13.6600	15.0475	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3357.7619	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2448.4023	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	118.1580	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6039.3222	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3357.7619	0.2100	705.1300	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2448.4023	0.2100	514.1645	(264)
Space and water heating			1219.2945	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	118.1580	0.1443	17.0539	(268)
Total CO2, kg/year			1252.3003	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			23.8300	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3357.7619	1.1300	3794.2709	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2448.4023	1.1300	2766.6947	(278)
Space and water heating			6560.9655	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	118.1580	1.5338	181.2348	(282)
Total Primary energy kWh/year			6916.1723	(286)
Dwelling Primary energy Rate (DPER)			131.6100	(287)

Full SAP Calculation Printout

Property Reference	Apt. 7	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 7	**Prop Type Ref**	
Property			

SAP Rating	80 C	**DER**	23.83	**TER**	
Environmental	83 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.18	**DFEE**	59.33	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	131.61	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		52.5500 (1b)	x	3.0100 (2b)	=	158.1755	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	158.1755	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8764	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8660	0.8491	0.8321	0.7472	0.7302	0.6453	0.6453	0.6283	0.6792	0.7302	0.7641	0.7981	(22b)
Effective ac	0.8750	0.8604	0.8462	0.7791	0.7666	0.7082	0.7082	0.6974	0.7307	0.7666	0.7920	0.8185	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			72.9400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		20.0217			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	14.5880	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	34.6097	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.6736	44.9135	44.1684	40.6689	40.0142	36.9662	36.9662	36.4018	38.1402	40.0142	41.3387	42.7235	(38)
Heat transfer coeff	80.2832	79.5231	78.7781	75.2786	74.6238	71.5759	71.5759	71.0114	72.7499	74.6238	75.9484	77.3331	(39)
Average = Sum(39)m / 12 =												75.2754	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.5277	1.5133	1.4991	1.4325	1.4201	1.3621	1.3621	1.3513	1.3844	1.4201	1.4453	1.4716	(40)
HLP (average)												1.4325	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7653	(42)
Hot water usage for mixer showers													
	60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)
Average daily hot water use (litres/day)												85.4593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)										Total = Sum(45)m =		1419.5892	
Distribution loss (46)m = 0.15 x (45)m													
	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.4678	41.9086	45.1183	41.8274	41.6632	38.7049	39.3914	40.6668	40.6516	43.7531	44.2040	47.3498	(61)
Total heat required for water heating calculated for each month													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
										Total per year (kWh/year) = Sum(64)m =		1932.2961	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	60.9192	53.5878	56.5263	49.0634	47.0116	41.7646	40.9326	43.0220	43.9607	49.6781	53.5122	60.2117	(65)

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5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.7265	14.8563	12.0820	9.1468	6.8374	5.7724	6.2373	8.1074	10.8818	13.8169	16.1264	17.1914	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	229.6298	232.0126	226.0080	213.2247	197.0882	181.9221	171.7902	169.4074	175.4120	188.1953	204.3318	219.4979	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	81.8806	79.7438	75.9762	68.1436	63.1876	58.0063	55.0169	57.8253	61.0565	66.7716	74.3224	80.9297	(72)
Total internal gains													
	417.8999	416.2757	403.7291	380.1780	356.7761	328.3637	315.7073	318.0031	330.0133	358.4468	384.4436	407.2820	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)

Solar gains	25.4814	51.8682	93.4500	153.4718	206.2962	219.9335	205.7433	164.0210	113.8703	63.3871	32.0622	20.8094	(83)
Total gains	443.3813	468.1439	497.1791	533.6498	563.0722	548.2973	521.4506	482.0240	443.8836	421.8339	416.5059	428.0914	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.4554	45.8899	46.3239	48.4773	48.9027	50.9851	50.9851	51.3904	50.1623	48.9027	48.0498	47.1894	
alpha	4.0304	4.0593	4.0883	4.2318	4.2602	4.3990	4.3990	4.4260	4.3442	4.2602	4.2033	4.1460	
util living area													
	0.9922	0.9893	0.9809	0.9541	0.8839	0.7351	0.5761	0.6333	0.8592	0.9646	0.9878	0.9933	(86)
MIT	19.2808	19.4364	19.7445	20.2206	20.6184	20.8919	20.9715	20.9579	20.7641	20.2822	19.7528	19.3158	(87)
Th 2	19.6668	19.6776	19.6882	19.7385	19.7480	19.7925	19.7925	19.8009	19.7753	19.7480	19.7288	19.7089	(88)
util rest of house													
	0.9896	0.9855	0.9738	0.9356	0.8351	0.6329	0.4316	0.4890	0.7823	0.9466	0.9828	0.9910	(89)
MIT 2	18.1496	18.3118	18.6241	19.1243	19.4945	19.7441	19.7858	19.7895	19.6469	19.1971	18.6645	18.2152	(90)
Living area fraction										fLA = Living area / (4) =		0.4289	(91)
MIT	18.6348	18.7942	19.1047	19.5945	19.9766	20.2364	20.2944	20.2906	20.1261	19.6625	19.1313	18.6873	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.4848	18.6442	18.9547	19.4445	19.8266	20.0864	20.1444	20.1406	19.9761	19.5125	18.9813	18.5373	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9862	0.9814	0.9684	0.9302	0.8387	0.6602	0.4758	0.5326	0.7973	0.9421	0.9787	0.9880	(94)
Useful gains	437.2824	459.4593	481.4563	496.4003	472.2317	361.9587	248.1013	256.7457	353.8945	397.4306	407.6490	422.9701	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1138.7979	1092.9822	981.1537	793.7770	606.4347	392.6959	253.6900	265.6271	427.4866	665.0855	902.3660	1108.7452	(97)
Space heating kWh													
	521.9275	425.7274	371.7749	214.1112	99.8470	0.0000	0.0000	0.0000	0.0000	199.1353	356.1963	510.2167	(98a)
Space heating requirement - total per year (kWh/year)												2698.9362	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	521.9275	425.7274	371.7749	214.1112	99.8470	0.0000	0.0000	0.0000	0.0000	199.1353	356.1963	510.2167	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2698.9362	
Space heating per m2											(98c) / (4) =	51.3594	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	521.9275	425.7274	371.7749	214.1112	99.8470	0.0000	0.0000	0.0000	0.0000	199.1353	356.1963	510.2167	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	621.3423	506.8183	442.5892	254.8943	118.8655	0.0000	0.0000	0.0000	0.0000	237.0658	424.0432	607.4008	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.3450	81.2011	80.8219	79.9284	78.3309	75.0000	75.0000	75.0000	75.0000	79.7334	80.8421	81.3233	(217)
Fuel for water heating, kWh/month													
	239.7115	211.2837	224.1949	197.5984	193.6983	180.2815	177.1724	185.9731	189.7322	200.9996	212.6449	237.1231	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.6406	11.7452	10.5753	7.7479	5.9847	4.8896	5.4594	7.0964	9.2175	12.0939	13.6600	15.0475	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3213.0193	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2450.4137	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	118.1580	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5896.5910	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3213.0193	3.6400	116.9539	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2450.4137	3.6400	89.1951	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	118.1580	16.4900	19.4843	(250)
Additional standing charges			92.0000	(251)
Total energy cost			336.5967	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.2422	(257)
SAP value		79.8642	
SAP rating (Section 12)		80	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3213.0193	0.2100	674.7341	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2450.4137	0.2100	514.5869	(264)
Space and water heating			1189.3209	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	118.1580	0.1443	17.0539	(268)
Total CO2, kg/year			1222.3267	(272)
CO2 emissions per m2			23.2600	(273)
EI value			83.2095	
EI rating			83	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.1755	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8764	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8151	0.7981	0.7811	0.7132	0.6962	0.6283	0.6283	0.6283	0.6283	0.7132	0.7302	0.7641	(22b)
Effective ac	0.8322	0.8185	0.8051	0.7543	0.7424	0.6974	0.6974	0.6974	0.6974	0.7543	0.7666	0.7920	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			72.9400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		20.0217			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	14.5880	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	34.6097	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

(38)m	43.4384	42.7235	42.0236	39.3745	38.7498	36.4018	36.4018	36.4018	36.4018	39.3745	40.0142	41.3387 (38)
Heat transfer coeff												
	78.0481	77.3331	76.6332	73.9841	73.3595	71.0114	71.0114	71.0114	71.0114	73.9841	74.6238	75.9484 (39)
Average = Sum(39)m / 12 =												73.9967

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4852	1.4716	1.4583	1.4079	1.3960	1.3513	1.3513	1.3513	1.3513	1.4079	1.4201	1.4453	(40)
HLP (average)												1.4081	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7653 (42)
Hot water usage for mixer showers												
	60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092 (42a)
Hot water usage for baths												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses												
	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084 (42c)
Average daily hot water use (litres/day)												85.4593 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)										Total = Sum(45)m =		1419.5892	
Distribution loss (46)m = 0.15 x (45)m													
	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.4678	41.9086	45.1183	41.8274	41.6632	38.7049	39.3914	40.6668	40.6516	43.7531	44.2040	47.3498	(61)
Total heat required for water heating calculated for each month													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
										Total per year (kWh/year) = Sum(64)m =		1932.2961	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	60.9192	53.5878	56.5263	49.0634	47.0116	41.7646	40.9326	43.0220	43.9607	49.6781	53.5122	60.2117	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.7265	14.8563	12.0820	9.1468	6.8374	5.7724	6.2373	8.1074	10.8818	13.8169	16.1264	17.1914	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	229.6298	232.0126	226.0080	213.2247	197.0882	181.9221	171.7902	169.4074	175.4120	188.1953	204.3318	219.4979	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	81.8806	79.7438	75.9762	68.1436	63.1876	58.0063	55.0169	57.8253	61.0565	66.7716	74.3224	80.9297	(72)
Total internal gains													
	417.8999	416.2757	403.7291	380.1780	356.7761	328.3637	315.7073	318.0031	330.0133	358.4468	384.4436	407.2820	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)

Solar gains	23.5213	48.9866	92.4766	155.5180	205.2217	223.2325	202.4775	158.7974	113.8703	62.4266	30.1191	19.8185	(83)
Total gains	441.4212	465.2623	496.2056	535.6961	561.9978	551.5963	518.1849	476.8004	443.8836	420.8734	414.5627	427.1005	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	46.7572	47.1894	47.6204	49.3255	49.7455	51.3904	51.3904	51.3904	51.3904	49.3255	48.9027	48.0498	
alpha	4.1171	4.1460	4.1747	4.2884	4.3164	4.4260	4.4260	4.4260	4.4260	4.2884	4.2602	4.2033	
util living area													
	0.9916	0.9886	0.9796	0.9499	0.8710	0.7217	0.5975	0.6494	0.8536	0.9633	0.9865	0.9927	(86)
MIT	19.3957	19.5318	19.8223	20.2760	20.6666	20.9030	20.9664	20.9525	20.7814	20.3052	19.8364	19.4096	(87)
Th 2	19.6986	19.7089	19.7189	19.7573	19.7664	19.8009	19.8009	19.8009	19.8009	19.7573	19.7480	19.7288	(88)
util rest of house													
	0.9887	0.9846	0.9720	0.9298	0.8174	0.6176	0.4574	0.5070	0.7763	0.9447	0.9809	0.9901	(89)
MIT 2	18.2871	18.4295	18.7235	19.1915	19.5509	19.7585	19.7921	19.7874	19.6823	19.2263	18.7615	18.3232	(90)
Living area fraction										fLA = Living area / (4) =		0.4289	(91)
MIT	18.7626	18.9023	19.1948	19.6567	20.0295	20.2494	20.2958	20.2871	20.1537	19.6891	19.2226	18.7892	(92)

Temperature adjustment												-0.1500	
adjusted MIT	18.6126	18.7523	19.0448	19.5067	19.8795	20.0994	20.1458	20.1371	20.0037	19.5391	19.0726	18.6392	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9853	0.9805	0.9667	0.9247	0.8231	0.6459	0.4999	0.5499	0.7917	0.9403	0.9767	0.9871	(94)
Useful gains	434.9176	456.1982	479.6646	495.3745	462.6046	356.2728	259.0419	262.1719	351.4095	395.7681	404.9021	421.5809	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1085.8532	1048.0413	946.0230	769.9309	578.0353	383.4208	265.9936	272.4793	419.2336	653.9518	863.5909	1066.2513	(97)
Space heating kWh	484.2961	397.7186	346.9707	197.6806	85.8804	0.0000	0.0000	0.0000	0.0000	192.0886	330.2559	479.6347	(98a)
Space heating requirement - total per year (kWh/year)												2514.5258	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	484.2961	397.7186	346.9707	197.6806	85.8804	0.0000	0.0000	0.0000	0.0000	192.0886	330.2559	479.6347	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2514.5258	
Space heating per m2											(98c) / (4) =	47.8502	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	484.2961	397.7186	346.9707	197.6806	85.8804	0.0000	0.0000	0.0000	0.0000	192.0886	330.2559	479.6347	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	576.5430	473.4745	413.0604	235.3341	102.2386	0.0000	0.0000	0.0000	0.0000	228.6770	393.1618	570.9937	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.2028	81.0682	80.6786	79.7498	78.0214	75.0000	75.0000	75.0000	75.0000	79.6525	80.6854	81.2056	(217)
Fuel for water heating, kWh/month	240.1312	211.6301	224.5932	198.0409	194.4667	180.2815	177.1724	185.9731	189.7322	201.2038	213.0579	237.4667	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.6406	11.7452	10.5753	7.7479	5.9847	4.8896	5.4594	7.0964	9.2175	12.0939	13.6600	15.0475	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2993.4831	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2453.7498	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	118.1580	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5680.3910	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2993.4831	5.6000	167.6351	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2453.7498	5.6000	137.4100	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)

Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	118.1580	26.0600	30.7920	(250)
Additional standing charges			99.0000	(251)
Total energy cost			464.8060	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2993.4831	0.2100	628.6315	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2453.7498	0.2100	515.2875	(264)
Space and water heating			1143.9189	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	118.1580	0.1443	17.0539	(268)
Total CO2, kg/year			1176.9247	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2993.4831	1.1300	3382.6359	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2453.7498	1.1300	2772.7373	(278)
Space and water heating			6155.3732	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	118.1580	1.5338	181.2348	(282)
Total Primary energy kWh/year			6510.5800	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 7

Current energy efficiency rating: C 80
Current environmental impact rating: B 83

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: C 80
Potential environmental impact rating: B 83

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£61	£61	£0
Mains gas	£404	£404	£0
Space heating	£297	£297	£0
Water heating	£137	£137	£0
Lighting	£31	£31	£0
Total cost of fuels	£465	£465	£0
Total cost of uses	£465	£465	£0
Delivered energy	108 kWh/m²	108 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.2 tonnes	1.2 tonnes	0.0 tonnes
CO2 emissions per m²	22 kg/m²	22 kg/m²	0 kg/m²
Primary energy	124 kWh/m²	124 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	52.5500	(1b)	x 3.0100	(2b) =	158.1755	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.5500					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		158.1755	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8764	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.8660	0.8491	0.8321	0.7472	0.7302	0.6453	0.6453	0.6283	0.6792	0.7302	0.7641	0.7981	(22b)
Effective ac	0.8750	0.8604	0.8462	0.7791	0.7666	0.7082	0.7082	0.6974	0.7307	0.7666	0.7920	0.8185	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			72.9400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		20.0217			(33)
Party Floor 1			52.5600					(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							14.5880	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		34.6097	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	45.6736	44.9135	44.1684	40.6689	40.0142	36.9662	36.9662	36.4018	38.1402	40.0142	41.3387	42.7235	(38)
Heat transfer coeff	80.2832	79.5231	78.7781	75.2786	74.6238	71.5759	71.5759	71.0114	72.7499	74.6238	75.9484	77.3331	(39)
Average = Sum(39)m / 12 =												75.2754	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.5277	1.5133	1.4991	1.4325	1.4201	1.3621	1.3621	1.3513	1.3844	1.4201	1.4453	1.4716	(40)
HLP (average)												1.4325	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.7653 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)
Average daily hot water use (litres/day)												85.4593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte	147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)										Total = Sum(45)m =		1419.5892	
Distribution loss (46)m = 0.15 x (45)m	22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	47.4678	41.9086	45.1183	41.8274	41.6632	38.7049	39.3914	40.6668	40.6516	43.7531	44.2040	47.3498	(61)
Total heat required for water heating calculated for each month	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
										Total per year (kWh/year) = Sum(64)m =		1932.2961	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	60.9192	53.5878	56.5263	49.0634	47.0116	41.7646	40.9326	43.0220	43.9607	49.6781	53.5122	60.2117	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.7265	14.8563	12.0820	9.1468	6.8374	5.7724	6.2373	8.1074	10.8818	13.8169	16.1264	17.1914	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	229.6298	232.0126	226.0080	213.2247	197.0882	181.9221	171.7902	169.4074	175.4120	188.1953	204.3318	219.4979	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	81.8806	79.7438	75.9762	68.1436	63.1876	58.0063	55.0169	57.8253	61.0565	66.7716	74.3224	80.9297	(72)
Total internal gains													
	417.8999	416.2757	403.7291	380.1780	356.7761	328.3637	315.7073	318.0031	330.0133	358.4468	384.4436	407.2820	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	25.4814	51.8682	93.4500	153.4718	206.2962	219.9335	205.7433	164.0210	113.8703	63.3871	32.0622	20.8094	(83)
Total gains	443.3813	468.1439	497.1791	533.6498	563.0722	548.2973	521.4506	482.0240	443.8836	421.8339	416.5059	428.0914	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	45.4554	45.8899	46.3239	48.4773	48.9027	50.9851	50.9851	51.3904	50.1623	48.9027	48.0498	47.1894	
alpha	4.0304	4.0593	4.0883	4.2318	4.2602	4.3990	4.3990	4.4260	4.3442	4.2602	4.2033	4.1460	
util living area													
	0.9922	0.9893	0.9809	0.9541	0.8839	0.7351	0.5761	0.6333	0.8592	0.9646	0.9878	0.9933	(86)
MIT	19.2808	19.4364	19.7445	20.2206	20.6184	20.8919	20.9715	20.9579	20.7641	20.2822	19.7528	19.3158	(87)
Th 2	19.6668	19.6776	19.6882	19.7385	19.7480	19.7925	19.7925	19.8009	19.7753	19.7480	19.7288	19.7089	(88)
util rest of house													
	0.9896	0.9855	0.9738	0.9356	0.8351	0.6329	0.4316	0.4890	0.7823	0.9466	0.9828	0.9910	(89)
MIT 2	18.1496	18.3118	18.6241	19.1243	19.4945	19.7441	19.7858	19.7895	19.6469	19.1971	18.6645	18.2152	(90)
Living area fraction									fLA = Living area / (4) =			0.4289	(91)
MIT	18.6348	18.7942	19.1047	19.5945	19.9766	20.2364	20.2944	20.2906	20.1261	19.6625	19.1313	18.6873	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.4848	18.6442	18.9547	19.4445	19.8266	20.0864	20.1444	20.1406	19.9761	19.5125	18.9813	18.5373	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9862	0.9814	0.9684	0.9302	0.8387	0.6602	0.4758	0.5326	0.7973	0.9421	0.9787	0.9880	(94)
Useful gains	437.2824	459.4593	481.4563	496.4003	472.2317	361.9587	248.1013	256.7457	353.8945	397.4306	407.6490	422.9701	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1138.7979	1092.9822	981.1537	793.7770	606.4347	392.6959	253.6900	265.6271	427.4866	665.0855	902.3660	1108.7452	(97)
Space heating kWh													
	521.9275	425.7274	371.7749	214.1112	99.8470	0.0000	0.0000	0.0000	0.0000	199.1353	356.1963	510.2167	(98a)
Space heating requirement - total per year (kWh/year)												2698.9362	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	521.9275	425.7274	371.7749	214.1112	99.8470	0.0000	0.0000	0.0000	0.0000	199.1353	356.1963	510.2167	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2698.9362	
Space heating per m2											(98c) / (4) =	51.3594	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	521.9275	425.7274	371.7749	214.1112	99.8470	0.0000	0.0000	0.0000	0.0000	199.1353	356.1963	510.2167	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	621.3423	506.8183	442.5892	254.8943	118.8655	0.0000	0.0000	0.0000	0.0000	237.0658	424.0432	607.4008	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
Efficiency of water heater												75.0000	(216)

(217)m	81.3450	81.2011	80.8219	79.9284	78.3309	75.0000	75.0000	75.0000	75.0000	79.7334	80.8421	81.3233 (217)
Fuel for water heating, kWh/month												
	239.7115	211.2837	224.1949	197.5984	193.6983	180.2815	177.1724	185.9731	189.7322	200.9996	212.6449	237.1231 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	14.6406	11.7452	10.5753	7.7479	5.9847	4.8896	5.4594	7.0964	9.2175	12.0939	13.6600	15.0475 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3213.0193	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2450.4137	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	118.1580	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5896.5910	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3213.0193	3.6400	116.9539	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2450.4137	3.6400	89.1951	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	118.1580	16.4900	19.4843	(250)
Additional standing charges			92.0000	(251)
Total energy cost			336.5967	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.2422	(257)
SAP value		79.8642	
SAP rating (Section 12)		80	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3213.0193	0.2100	674.7341	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2450.4137	0.2100	514.5869	(264)
Space and water heating			1189.3209	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	118.1580	0.1443	17.0539	(268)
Total CO2, kg/year			1222.3267	(272)
CO2 emissions per m2			23.2600	(273)
EI value			83.2095	
EI rating			83	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)

Ground floor 52.5500 (1b) x 3.0100 (2b) = 158.1755 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n) 52.5500 (4)
Dwelling volume (3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 158.1755 (5)

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2. Ventilation rate
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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1264	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8764	(18)
Number of sides sheltered		3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.6792	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8151	0.7981	0.7811	0.7132	0.6962	0.6283	0.6283	0.6283	0.6283	0.7132	0.7302	0.7641	(22b)
Effective ac	0.8322	0.8185	0.8051	0.7543	0.7424	0.6974	0.6974	0.6974	0.6974	0.7543	0.7666	0.7920	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			5.3600	1.3258	7.1061			(27)
External Wall 1	20.3800	5.3600	15.0200	0.3000	4.5060			(29a)
External Roof 1	52.5600		52.5600	0.1600	8.4096			(30)
Total net area of external elements Aum(A, m2)			72.9400					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		20.0217			(33)
Party Floor 1			52.5600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	14.5880	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 34.6097	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	43.4384	42.7235	42.0236	39.3745	38.7498	36.4018	36.4018	36.4018	36.4018	39.3745	40.0142	41.3387	(38)
Heat transfer coeff	78.0481	77.3331	76.6332	73.9841	73.3595	71.0114	71.0114	71.0114	71.0114	73.9841	74.6238	75.9484	(39)
Average = Sum(39)m / 12 =												73.9967	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.4852	1.4716	1.4583	1.4079	1.3960	1.3513	1.3513	1.3513	1.3513	1.4079	1.4201	1.4453	(40)
HLP (average)												1.4081	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy	1.7653	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
60.4408	59.5325	58.2089	55.6765	53.8076	51.7235	50.5388	51.8524	53.2923	55.5301	58.1169	60.2092	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

32.7084	31.5190	30.3296	29.1402	27.9508	26.7614	26.7614	27.9508	29.1402	30.3296	31.5190	32.7084	(42c)

Average daily hot water use (litres/day)	85.4593 (43)

Daily hot water use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
93.1492	91.0515	88.5385	84.8167	81.7584	78.4849	77.3002	79.8032	82.4325	85.8596	89.6359	92.9176	(44)
Energy conte 147.5256	129.6561	136.0804	116.1098	110.0625	96.5063	93.4879	98.8130	101.6475	116.5107	127.7027	145.4865	(45)
Energy content (annual)									Total = Sum(45)m =			1419.5892	
Distribution loss (46)m = 0.15 x (45)m													
22.1288	19.4484	20.4121	17.4165	16.5094	14.4759	14.0232	14.8220	15.2471	17.4766	19.1554	21.8230	(46)
Water storage loss:													
Total storage loss													
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 47.4678	41.9086	45.1183	41.8274	41.6632	38.7049	39.3914	40.6668	40.6516	43.7531	44.2040	47.3498	(61)
Total heat required for water heating calculated for each month													
194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
								Total per year (kWh/year) = Sum(64)m =			1932.2961	(64)

Electric shower(s)

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
	60.9192	53.5878	56.5263	49.0634	47.0116	41.7646	40.9326	43.0220	43.9607	49.6781	53.5122	60.2117	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	105.9177	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	16.7265	14.8563	12.0820	9.1468	6.8374	5.7724	6.2373	8.1074	10.8818	13.8169	16.1264	17.1914	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	229.6298	232.0126	226.0080	213.2247	197.0882	181.9221	171.7902	169.4074	175.4120	188.1953	204.3318	219.4979	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	47.3571	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	-70.6118	(71)
Water heating gains (Table 5)													
	81.8806	79.7438	75.9762	68.1436	63.1876	58.0063	55.0169	57.8253	61.0565	66.7716	74.3224	80.9297	(72)
Total internal gains													
	417.8999	416.2757	403.7291	380.1780	356.7761	328.3637	315.7073	318.0031	330.0133	358.4468	384.4436	407.2820	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)

Solar gains	23.5213	48.9866	92.4766	155.5180	205.2217	223.2325	202.4775	158.7974	113.8703	62.4266	30.1191	19.8185	(83)
Total gains	441.4212	465.2623	496.2056	535.6961	561.9978	551.5963	518.1849	476.8004	443.8836	420.8734	414.5627	427.1005	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	46.7572	47.1894	47.6204	49.3255	49.7455	51.3904	51.3904	51.3904	51.3904	49.3255	48.9027	48.0498	
alpha	4.1171	4.1460	4.1747	4.2884	4.3164	4.4260	4.4260	4.4260	4.4260	4.2884	4.2602	4.2033	
util living area													
	0.9916	0.9886	0.9796	0.9499	0.8710	0.7217	0.5975	0.6494	0.8536	0.9633	0.9865	0.9927	(86)
MIT	19.3957	19.5318	19.8223	20.2760	20.6666	20.9030	20.9664	20.9525	20.7814	20.3052	19.8364	19.4096	(87)
Th 2	19.6986	19.7089	19.7189	19.7573	19.7664	19.8009	19.8009	19.8009	19.8009	19.7573	19.7480	19.7288	(88)
util rest of house													
	0.9887	0.9846	0.9720	0.9298	0.8174	0.6176	0.4574	0.5070	0.7763	0.9447	0.9809	0.9901	(89)
MIT 2	18.2871	18.4295	18.7235	19.1915	19.5509	19.7585	19.7921	19.7874	19.6823	19.2263	18.7615	18.3232	(90)
Living area fraction									fLA = Living area / (4) =			0.4289	(91)
MIT	18.7626	18.9023	19.1948	19.6567	20.0295	20.2494	20.2958	20.2871	20.1537	19.6891	19.2226	18.7892	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.6126	18.7523	19.0448	19.5067	19.8795	20.0994	20.1458	20.1371	20.0037	19.5391	19.0726	18.6392	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9853	0.9805	0.9667	0.9247	0.8231	0.6459	0.4999	0.5499	0.7917	0.9403	0.9767	0.9871	(94)
Useful gains	434.9176	456.1982	479.6646	495.3745	462.6046	356.2728	259.0419	262.1719	351.4095	395.7681	404.9021	421.5809	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1085.8532	1048.0413	946.0230	769.9309	578.0353	383.4208	265.9936	272.4793	419.2336	653.9518	863.5909	1066.2513	(97)
Space heating kWh													
	484.2961	397.7186	346.9707	197.6806	85.8804	0.0000	0.0000	0.0000	0.0000	192.0886	330.2559	479.6347	(98a)
Space heating requirement - total per year (kWh/year)												2514.5258	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	484.2961	397.7186	346.9707	197.6806	85.8804	0.0000	0.0000	0.0000	0.0000	192.0886	330.2559	479.6347	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2514.5258	
Space heating per m2											(98c) / (4) =	47.8502	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	484.2961	397.7186	346.9707	197.6806	85.8804	0.0000	0.0000	0.0000	0.0000	192.0886	330.2559	479.6347	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	576.5430	473.4745	413.0604	235.3341	102.2386	0.0000	0.0000	0.0000	0.0000	228.6770	393.1618	570.9937	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	194.9934	171.5647	181.1987	157.9372	151.7257	135.2112	132.8793	139.4799	142.2992	160.2639	171.9067	192.8363	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.2028	81.0682	80.6786	79.7498	78.0214	75.0000	75.0000	75.0000	75.0000	79.6525	80.6854	81.2056	(217)
Fuel for water heating, kWh/month													
	240.1312	211.6301	224.5932	198.0409	194.4667	180.2815	177.1724	185.9731	189.7322	201.2038	213.0579	237.4667	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	14.6406	11.7452	10.5753	7.7479	5.9847	4.8896	5.4594	7.0964	9.2175	12.0939	13.6600	15.0475	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2993.4831	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2453.7498	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	118.1580	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5680.3910	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2993.4831	5.6000	167.6351	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2453.7498	5.6000	137.4100	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	118.1580	26.0600	30.7920	(250)
Additional standing charges			99.0000	(251)
Total energy cost			464.8060	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2993.4831	0.2100	628.6315	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2453.7498	0.2100	515.2875	(264)
Space and water heating			1143.9189	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	118.1580	0.1443	17.0539	(268)
Total CO2, kg/year			1176.9247	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2993.4831	1.1300	3382.6359	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2453.7498	1.1300	2772.7373	(278)
Space and water heating			6155.3732	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	118.1580	1.5338	181.2348	(282)
Total Primary energy kWh/year			6510.5800	(286)

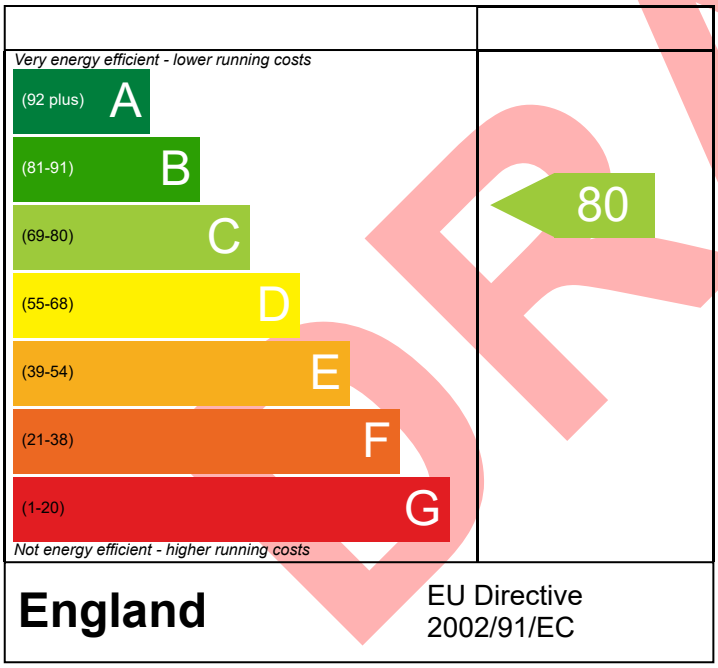
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	52.55 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

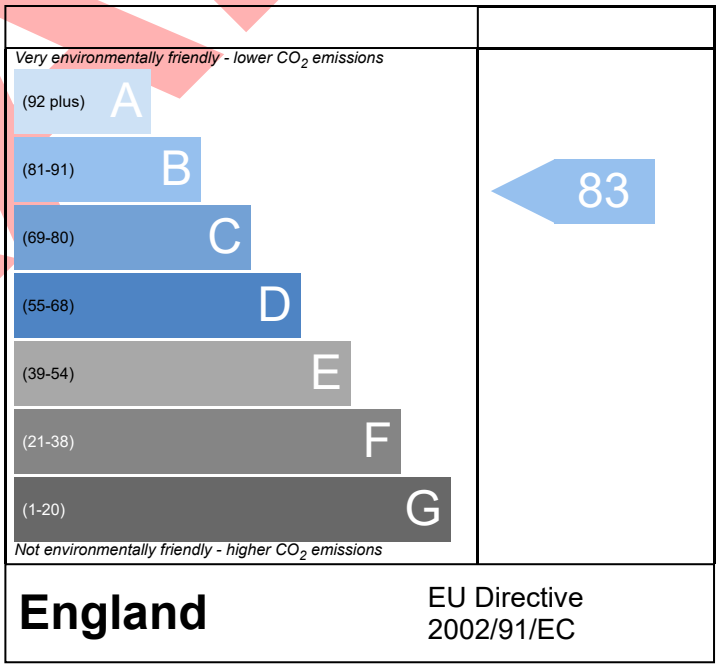
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

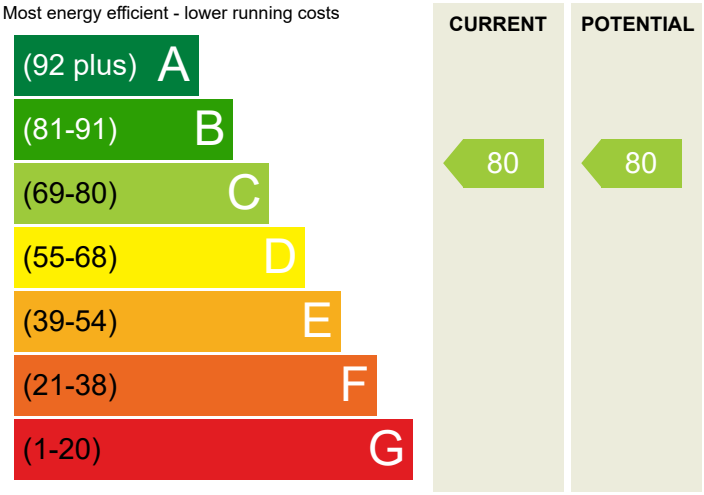
Energy Report

Dwelling Address	
Reference	Apt. 7-Apt. 7
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	53

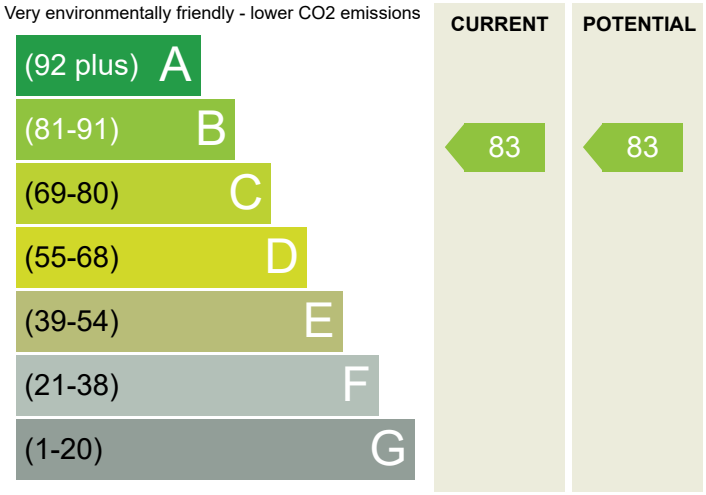
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

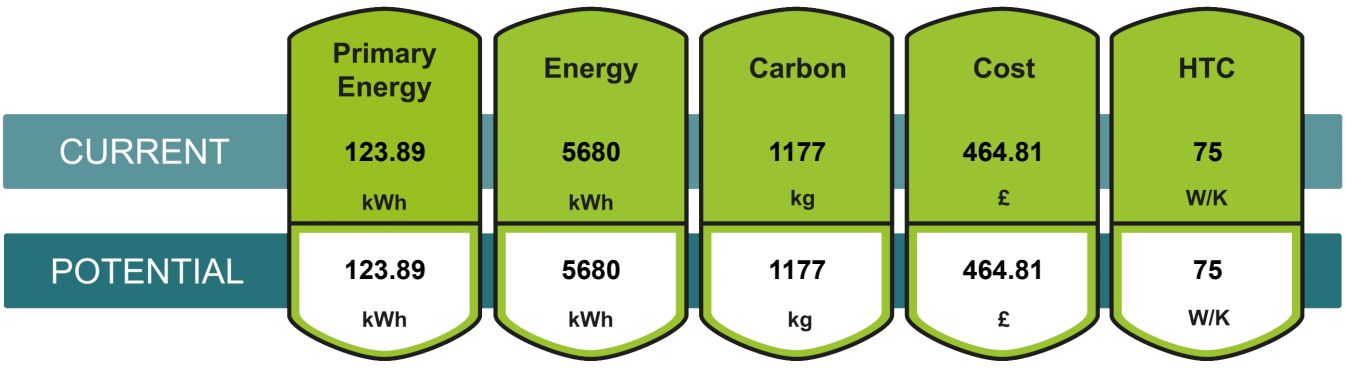
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£31	£31	
Heating	£297	£297	
Hot Water	£137	£137	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£465	£465	

Estimated energy use and potential savings

Space Heating
2993
kWh per year

Water Heating
2454
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 7	Issued on Date	01/10/2024
Assessment Reference	Apt. 7	Prop Type Ref	Detached Flat
Property			

SAP Rating	80 C	DER	23.83	TER	
Environmental	83 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.18	DFEE	59.33	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	131.61	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Southwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1	
Type	Solid Wall	
Construction	Other	
U-value	0.30	W/m²K U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	20.38	m²

Comments

External Roofs

Dwelling Sign Off Report

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	52.56	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NE1	New Glazing	External Wall 1	North East	5.36

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1 SAP table

Fuel Type	Mains gas	
Winter Efficiency	84.00	%
Summer Efficiency	75.00	%
Model Name		
Manufacturer		
System Type		
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Flow Temperature Value		

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2 None

Secondary Heating None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Dwelling Sign Off Report

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 8	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 8	**Prop Type Ref**	
Property			

SAP Rating	79 C	**DER**	24.59	**TER**	
Environmental	81 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.57	**DFEE**	67.74	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	135.12	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	17.98 m	68.11 m²	3.01 m

8.0 Living Area	23.24	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	48.22	38.78	0.00	None	9.44	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	68.11	68.11	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	68.11

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NE1	New Glazing	External Wall 1	North East	5.36	0
W SE1	New Glazing	External Wall 1	South East	4.08	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

Summary for Input Data

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None	

28.0 Water Heating

Water Heating	Main Heating 1	
SAP Code	901	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
Immersion Heater	Single	
Summer Immersion	No	
Cold Water Source	From mains	
Bath Count	0	
Supplementary Immersion	No	
Immersion Only Heating Hot Water	No	

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 8	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 8	**Prop Type Ref**	
Property			

SAP Rating	79 C	**DER**	24.59	**TER**	
Environmental	81 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.57	**DFEE**	67.74	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	135.12	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8476 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9185	0.9005	0.8825	0.7925	0.7745	0.6844	0.6844	0.6664	0.7204	0.7745	0.8105	0.8465	(22b)
Effective ac	0.9219	0.9055	0.8894	0.8140	0.7999	0.7342	0.7342	0.7220	0.7595	0.7999	0.8284	0.8583	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			116.3300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.0468			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.2660	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	58.3128	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	62.3670	61.2587	60.1724	55.0701	54.1155	49.6715	49.6715	48.8485	51.3832	54.1155	56.0467	58.0656	(38)
Heat transfer coeff	120.6797	119.5715	118.4852	113.3828	112.4282	107.9842	107.9842	107.1613	109.6960	112.4282	114.3594	116.3784	(39)
Average = Sum(39)m / 12 =												113.3783	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.7718	1.7556	1.7396	1.6647	1.6507	1.5854	1.5854	1.5734	1.6106	1.6507	1.6790	1.7087	(40)
HLP (average)												1.6646	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.1994 (42)

Hot water usage for mixer showers

68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)

Average daily hot water use (litres/day) 97.0684 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)										Total = Sum(45)m =		1612.4316	
Distribution loss (46)m = 0.15 x (45)m													
	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	47.5094	47.3229	43.9627	44.7424	46.1912	46.1739	49.6968	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(64)
										Total per year (kWh/year) = Sum(64)m =		2186.2499	(64)
12Total per year (kWh/year)												2186	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.4554	60.4738	64.1329	55.7283	53.3978	47.4380	46.4930	48.8663	49.9325	56.4266	60.5580	67.6854	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	101.6813	112.5757	101.6813	105.0707	101.6813	105.0707	101.6813	101.6813	105.0707	101.6813	105.0707	101.6813	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	192.8463	194.8475	189.8047	179.0691	165.5174	152.7807	144.2718	142.2707	147.3135	158.0490	171.6007	184.3374	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	92.0100	89.9908	86.2002	77.4004	71.7712	65.8861	62.4906	65.6805	69.3507	75.8422	84.1084	90.9750	(72)
Total internal gains													
	449.5283	460.4047	440.6768	424.5309	401.9606	379.7282	364.4344	365.6232	377.7256	398.5632	423.7705	439.9844	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	4.0800	36.7938	0.7600	0.8000	0.7700	63.2517	(77)

Solar gains	88.7331	159.6092	240.8659	336.1272	410.8855	423.0434	401.5629	343.4769	273.4906	182.4638	107.8232	74.9397	(83)
Total gains	538.2614	620.0139	681.5427	760.6581	812.8461	802.7716	765.9973	709.1001	651.2162	581.0270	531.5936	514.9240	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.1935	39.5568	39.9194	41.7158	42.0701	43.8014	43.8014	44.1378	43.1179	42.0701	41.3596	40.6421	
alpha	3.6129	3.6371	3.6613	3.7811	3.8047	3.9201	3.9201	3.9425	3.8745	3.8047	3.7573	3.7095	
util living area													
	0.9938	0.9889	0.9793	0.9491	0.8783	0.7332	0.5802	0.6346	0.8499	0.9636	0.9891	0.9948	(86)
MIT	18.9070	19.1403	19.5068	20.0646	20.5216	20.8505	20.9553	20.9372	20.7046	20.1210	19.4728	18.9388	(87)
Th 2	19.4898	19.5013	19.5126	19.5662	19.5764	19.6240	19.6240	19.6329	19.6056	19.5764	19.5559	19.5346	(88)
util rest of house													
	0.9915	0.9849	0.9713	0.9279	0.8243	0.6206	0.4175	0.4733	0.7639	0.9441	0.9844	0.9929	(89)
MIT 2	17.6528	17.8921	18.2621	18.8416	19.2656	19.5594	19.6142	19.6171	19.4510	18.9120	18.2623	17.7156	(90)
Living area fraction									fLA = Living area / (4) =			0.3412	(91)
MIT	18.0807	18.3180	18.6868	19.2589	19.6942	20.0000	20.0718	20.0675	19.8787	19.3245	18.6753	18.1330	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9307	18.1680	18.5368	19.1089	19.5442	19.8500	19.9218	19.9175	19.7287	19.1745	18.5253	17.9830	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9880	0.9798	0.9639	0.9190	0.8229	0.6414	0.4552	0.5100	0.7732	0.9366	0.9795	0.9899	(94)
Useful gains	531.8264	607.4622	656.9234	699.0657	668.8600	514.9333	348.7190	361.6510	503.5016	544.1629	520.6956	509.7343	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1644.9516	1586.4707	1426.1848	1157.5152	881.9071	566.9150	358.7028	376.9449	617.4490	964.0199	1306.5936	1604.0396	(97)
Space heating kWh													
	828.1651	657.8937	572.3305	330.0836	158.5070	0.0000	0.0000	0.0000	0.0000	312.3736	565.8466	814.1631	(98a)
Space heating requirement - total per year (kWh/year)												4239.3633	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	828.1651	657.8937	572.3305	330.0836	158.5070	0.0000	0.0000	0.0000	0.0000	312.3736	565.8466	814.1631	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4239.3633	
Space heating per m2											(98c) / (4) =	62.2429	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	828.1651	657.8937	572.3305	330.0836	158.5070	0.0000	0.0000	0.0000	0.0000	312.3736	565.8466	814.1631	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	985.9109	783.2068	681.3458	392.9567	188.6989	0.0000	0.0000	0.0000	0.0000	371.8734	673.6269	969.2418	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.9470	81.7717	81.4185	80.5946	79.0582	75.0000	75.0000	75.0000	75.0000	80.4457	81.4995	81.9368	(217)
Fuel for water heating, kWh/month													
	266.6663	236.3856	252.4302	222.5855	217.9870	204.7716	201.2401	211.2365	215.5063	226.2828	238.4866	263.8728	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	16.9608	13.6066	12.2512	8.9757	6.9331	5.6644	6.3246	8.2210	10.6783	14.0105	15.8248	17.4322	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5046.8611	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2757.4513	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	136.8831	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	8056.1954	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5046.8611	0.2100	1059.8408	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2757.4513	0.2100	579.0648	(264)
Space and water heating			1638.9056	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	136.8831	0.1443	19.7565	(268)
Total CO2, kg/year			1674.6140	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			24.5900	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	5046.8611	1.1300	5702.9530	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2757.4513	1.1300	3115.9200	(278)
Space and water heating			8818.8729	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	136.8831	1.5338	209.9558	(282)
Total Primary energy kWh/year			9202.8008	(286)
Dwelling Primary energy Rate (DPER)			135.1200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 8	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 8	**Prop Type Ref**	
Property			

SAP Rating	79 C	**DER**	24.59	**TER**	
Environmental	81 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.57	**DFEE**	67.74	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	135.12	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8476 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9185	0.9005	0.8825	0.7925	0.7745	0.6844	0.6844	0.6664	0.7204	0.7745	0.8105	0.8465	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9219	0.9055	0.8894	0.8140	0.7999	0.7342	0.7342	0.7220	0.7595	0.7999	0.8284	0.8583	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			116.3300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		35.0468			(33)
Party Floor 1			68.1100					(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							23.2660	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		58.3128	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	62.3670	61.2587	60.1724	55.0701	54.1155	49.6715	49.6715	48.8485	51.3832	54.1155	56.0467	58.0656	(38)
Heat transfer coeff	120.6797	119.5715	118.4852	113.3828	112.4282	107.9842	107.9842	107.1613	109.6960	112.4282	114.3594	116.3784	(39)
Average = Sum(39)m / 12 =												113.3783	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7718	1.7556	1.7396	1.6647	1.6507	1.5854	1.5854	1.5734	1.6106	1.6507	1.6790	1.7087	(40)
HLP (average)												1.6646	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1994	(42)
Hot water usage for mixer showers													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths													
	26.3965	26.0045	25.4524	24.4345	23.6724	22.8272	22.3707	22.9189	23.5158	24.4201	25.4590	26.3073	(42b)
Hot water usage for other uses													
	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												58.2499	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	63.5503	61.8073	59.9042	57.5352	55.4220	53.2258	52.7693	54.6686	56.6165	58.8719	61.2618	63.4611	(44)
Energy conte	100.6482	88.0127	92.0705	78.7629	74.6087	65.4473	63.8199	67.6911	69.8138	79.8886	87.2786	99.3648	(45)
Energy content (annual)										Total = Sum(45)m =		967.4070	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	85.5510	74.8108	78.2599	66.9484	63.4174	55.6302	54.2469	57.5374	59.3417	67.9053	74.1868	84.4600	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	85.5510	74.8108	78.2599	66.9484	63.4174	55.6302	54.2469	57.5374	59.3417	67.9053	74.1868	84.4600	(64)
										Total per year (kWh/year) = Sum(64)m =		822.2959	(64)
12Total per year (kWh/year)												822	(64)
Electric shower(s)													
	48.9277	43.5950	47.6041	45.4280	46.2804	44.1470	45.6186	46.2804	45.4280	47.6041	46.7089	48.9277	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												556.5498	(64a)
Heat gains from water heating, kWh/month													
	33.6197	29.6015	31.4660	28.0941	27.4244	24.9443	24.9664	25.9545	26.1924	28.8773	30.2239	33.3469	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	101.6813	112.5757	101.6813	105.0707	101.6813	105.0707	101.6813	101.6813	105.0707	101.6813	105.0707	101.6813	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	192.8463	194.8475	189.8047	179.0691	165.5174	152.7807	144.2718	142.2707	147.3135	158.0490	171.6007	184.3374	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	45.1877	44.0498	42.2930	39.0196	36.8608	34.6449	33.5570	34.8850	36.3784	38.8136	41.9777	44.8212	(72)
Total internal gains													
	395.7060	407.4637	389.7696	379.1500	360.0502	348.4870	335.5008	334.8277	344.7532	354.5346	374.6398	386.8306	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	4.0800	36.7938	0.7600	0.8000	0.7700	63.2517	(77)

Solar gains	88.7331	159.6092	240.8659	336.1272	410.8855	423.0434	401.5629	343.4769	273.4906	182.4638	107.8232	74.9397	(83)
Total gains	484.4391	567.0729	630.6356	715.2773	770.9357	771.5304	737.0637	678.3046	618.2438	536.9985	482.4630	461.7702	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.1935	39.5568	39.9194	41.7158	42.0701	43.8014	43.8014	44.1378	43.1179	42.0701	41.3596	40.6421	
alpha	3.6129	3.6371	3.6613	3.7811	3.8047	3.9201	3.9201	3.9425	3.8745	3.8047	3.7573	3.7095	
util living area													
	0.9956	0.9917	0.9837	0.9573	0.8928	0.7507	0.5983	0.6556	0.8666	0.9713	0.9921	0.9964	(86)
MIT	18.8326	19.0683	19.4399	20.0112	20.4847	20.8368	20.9502	20.9295	20.6789	20.0658	19.4052	18.8643	(87)
Th 2	19.4898	19.5013	19.5126	19.5662	19.5764	19.6240	19.6240	19.6329	19.6056	19.5764	19.5559	19.5346	(88)
util rest of house													
	0.9940	0.9886	0.9773	0.9390	0.8429	0.6394	0.4327	0.4924	0.7854	0.9554	0.9886	0.9951	(89)
MIT 2	17.5790	17.8211	18.1972	18.7924	19.2364	19.5523	19.6129	19.6148	19.4337	18.8608	18.1957	17.6417	(90)
Living area fraction										fLA = Living area / (4) =		0.3412	(91)
MIT	18.0067	18.2467	18.6212	19.2083	19.6623	19.9906	20.0692	20.0634	19.8586	19.2720	18.6084	18.0588	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.0067	18.2467	18.6212	19.2083	19.6623	19.9906	20.0692	20.0634	19.8586	19.2720	18.6084	18.0588	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9916	0.9849	0.9718	0.9330	0.8465	0.6726	0.4900	0.5485	0.8033	0.9507	0.9853	0.9931	(94)
Useful gains	480.3711	558.5185	612.8746	667.3467	652.6277	518.9450	361.1633	372.0506	496.6462	510.5494	475.3621	458.5768	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1654.1262	1595.8803	1436.1869	1168.7807	895.1902	582.1000	374.6219	392.5720	631.6970	974.9730	1316.0950	1612.8685	(97)
Space heating kWh													
	873.2738	697.1071	612.5443	361.0324	180.4665	0.0000	0.0000	0.0000	0.0000	345.5312	605.3277	858.7930	(98a)
Space heating requirement - total per year (kWh/year)												4534.0761	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	873.2738	697.1071	612.5443	361.0324	180.4665	0.0000	0.0000	0.0000	0.0000	345.5312	605.3277	858.7930	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4534.0761	
Space heating per m2											(98c) / (4) =	66.5699	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	1015.0519	799.0834	814.4258	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7263	0.8080	0.7667	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	737.2118	645.6377	624.4348	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	860.4221	822.2437	755.5747	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	88.7114	131.3949	97.5681	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	22.1778	32.8487	24.3920	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												79.4186	(107)
Energy for space heating												66.5699	(99)
Energy for space cooling												1.1660	(108)
Total												67.7359	(109)
Fabric Energy Efficiency (DFEE)												67.7	(109)

Full SAP Calculation Printout

Property Reference	Apt. 8	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 8	**Prop Type Ref**	
Property			

SAP Rating	79 C	**DER**	24.59	**TER**	
Environmental	81 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.57	**DFEE**	67.74	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	135.12	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8476 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9185	0.9005	0.8825	0.7925	0.7745	0.6844	0.6844	0.6664	0.7204	0.7745	0.8105	0.8465	(22b)
Effective ac	0.9219	0.9055	0.8894	0.8140	0.7999	0.7342	0.7342	0.7220	0.7595	0.7999	0.8284	0.8583	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			116.3300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.0468			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.2660	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	58.3128	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	62.3670	61.2587	60.1724	55.0701	54.1155	49.6715	49.6715	48.8485	51.3832	54.1155	56.0467	58.0656	(38)
Heat transfer coeff	120.6797	119.5715	118.4852	113.3828	112.4282	107.9842	107.9842	107.1613	109.6960	112.4282	114.3594	116.3784	(39)
Average = Sum(39)m / 12 =												113.3783	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.7718	1.7556	1.7396	1.6647	1.6507	1.5854	1.5854	1.5734	1.6106	1.6507	1.6790	1.7087	(40)
HLP (average)												1.6646	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.1994 (42)

Hot water usage for mixer showers

68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)

Average daily hot water use (litres/day) 97.0684 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)										Total = Sum(45)m =		1612.4316	
Distribution loss (46)m = 0.15 x (45)m													
	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	47.5094	47.3229	43.9627	44.7424	46.1912	46.1739	49.6968	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(64)
										Total per year (kWh/year) = Sum(64)m =		2186.2499	(64)
12Total per year (kWh/year)												2186	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.4554	60.4738	64.1329	55.7283	53.3978	47.4380	46.4930	48.8663	49.9325	56.4266	60.5580	67.6854	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	109.9690	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	101.6813	112.5757	101.6813	105.0707	101.6813	105.0707	101.6813	101.6813	105.0707	101.6813	105.0707	101.6813	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	192.8463	194.8475	189.8047	179.0691	165.5174	152.7807	144.2718	142.2707	147.3135	158.0490	171.6007	184.3374	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	33.9969	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	92.0100	89.9908	86.2002	77.4004	71.7712	65.8861	62.4906	65.6805	69.3507	75.8422	84.1084	90.9750	(72)
Total internal gains													
	449.5283	460.4047	440.6768	424.5309	401.9606	379.7282	364.4344	365.6232	377.7256	398.5632	423.7705	439.9844	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	4.0800	36.7938	0.7600	0.8000	0.7700	63.2517	(77)

Solar gains	88.7331	159.6092	240.8659	336.1272	410.8855	423.0434	401.5629	343.4769	273.4906	182.4638	107.8232	74.9397	(83)
Total gains	538.2614	620.0139	681.5427	760.6581	812.8461	802.7716	765.9973	709.1001	651.2162	581.0270	531.5936	514.9240	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.1935	39.5568	39.9194	41.7158	42.0701	43.8014	43.8014	44.1378	43.1179	42.0701	41.3596	40.6421	
alpha	3.6129	3.6371	3.6613	3.7811	3.8047	3.9201	3.9201	3.9425	3.8745	3.8047	3.7573	3.7095	
util living area													
	0.9938	0.9889	0.9793	0.9491	0.8783	0.7332	0.5802	0.6346	0.8499	0.9636	0.9891	0.9948	(86)
MIT	18.9070	19.1403	19.5068	20.0646	20.5216	20.8505	20.9553	20.9372	20.7046	20.1210	19.4728	18.9388	(87)
Th 2	19.4898	19.5013	19.5126	19.5662	19.5764	19.6240	19.6240	19.6329	19.6056	19.5764	19.5559	19.5346	(88)
util rest of house													
	0.9915	0.9849	0.9713	0.9279	0.8243	0.6206	0.4175	0.4733	0.7639	0.9441	0.9844	0.9929	(89)
MIT 2	17.6528	17.8921	18.2621	18.8416	19.2656	19.5594	19.6142	19.6171	19.4510	18.9120	18.2623	17.7156	(90)
Living area fraction									fLA = Living area / (4) =			0.3412	(91)
MIT	18.0807	18.3180	18.6868	19.2589	19.6942	20.0000	20.0718	20.0675	19.8787	19.3245	18.6753	18.1330	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9307	18.1680	18.5368	19.1089	19.5442	19.8500	19.9218	19.9175	19.7287	19.1745	18.5253	17.9830	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9880	0.9798	0.9639	0.9190	0.8229	0.6414	0.4552	0.5100	0.7732	0.9366	0.9795	0.9899	(94)
Useful gains	531.8264	607.4622	656.9234	699.0657	668.8600	514.9333	348.7190	361.6510	503.5016	544.1629	520.6956	509.7343	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1644.9516	1586.4707	1426.1848	1157.5152	881.9071	566.9150	358.7028	376.9449	617.4490	964.0199	1306.5936	1604.0396	(97)
Space heating kWh													
	828.1651	657.8937	572.3305	330.0836	158.5070	0.0000	0.0000	0.0000	0.0000	312.3736	565.8466	814.1631	(98a)
Space heating requirement - total per year (kWh/year)												4239.3633	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	828.1651	657.8937	572.3305	330.0836	158.5070	0.0000	0.0000	0.0000	0.0000	312.3736	565.8466	814.1631	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4239.3633	
Space heating per m2											(98c) / (4) =	62.2429	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	828.1651	657.8937	572.3305	330.0836	158.5070	0.0000	0.0000	0.0000	0.0000	312.3736	565.8466	814.1631	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	985.9109	783.2068	681.3458	392.9567	188.6989	0.0000	0.0000	0.0000	0.0000	371.8734	673.6269	969.2418	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.9470	81.7717	81.4185	80.5946	79.0582	75.0000	75.0000	75.0000	75.0000	80.4457	81.4995	81.9368	(217)
Fuel for water heating, kWh/month													
	266.6663	236.3856	252.4302	222.5855	217.9870	204.7716	201.2401	211.2365	215.5063	226.2828	238.4866	263.8728	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	16.9608	13.6066	12.2512	8.9757	6.9331	5.6644	6.3246	8.2210	10.6783	14.0105	15.8248	17.4322	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	5046.8611	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2757.4513	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	136.8831	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	8056.1954	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	5046.8611	0.2100	1059.8408	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2757.4513	0.2100	579.0648	(264)
Space and water heating			1638.9056	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	136.8831	0.1443	19.7565	(268)
Total CO2, kg/year			1674.6140	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			24.5900	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	5046.8611	1.1300	5702.9530	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2757.4513	1.1300	3115.9200	(278)
Space and water heating			8818.8729	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	136.8831	1.5338	209.9558	(282)
Total Primary energy kWh/year			9202.8008	(286)
Dwelling Primary energy Rate (DPER)			135.1200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 8	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 8	**Prop Type Ref**	
Property			

SAP Rating	79 C	**DER**	24.59	**TER**	
Environmental	81 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.57	**DFEE**	67.74	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	135.12	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8476 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9185	0.9005	0.8825	0.7925	0.7745	0.6844	0.6844	0.6664	0.7204	0.7745	0.8105	0.8465	(22b)
Effective ac	0.9219	0.9055	0.8894	0.8140	0.7999	0.7342	0.7342	0.7220	0.7595	0.7999	0.8284	0.8583	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			116.3300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.0468			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		23.2660 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	58.3128 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	62.3670	61.2587	60.1724	55.0701	54.1155	49.6715	49.6715	48.8485	51.3832	54.1155	56.0467	58.0656	(38)
Heat transfer coeff	120.6797	119.5715	118.4852	113.3828	112.4282	107.9842	107.9842	107.1613	109.6960	112.4282	114.3594	116.3784	(39)
Average = Sum(39)m / 12 =												113.3783	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.7718	1.7556	1.7396	1.6647	1.6507	1.5854	1.5854	1.5734	1.6106	1.6507	1.6790	1.7087	(40)
HLP (average)												1.6646	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1994	(42)
Hot water usage for mixer showers													
	68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												97.0684	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)										Total = Sum(45)m =		1612.4316	
Distribution loss (46)m = 0.15 x (45)m													
	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	47.5094	47.3229	43.9627	44.7424	46.1912	46.1739	49.6968	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(64)
									Total per year (kWh/year) = Sum(64)m =			2186.2499	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.4554	60.4738	64.1329	55.7283	53.3978	47.4380	46.4930	48.8663	49.9325	56.4266	60.5580	67.6854	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.3772	17.2107	13.9967	10.5964	7.9209	6.6872	7.2257	9.3923	12.6063	16.0066	18.6820	19.9158	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	287.8303	290.8171	283.2905	267.2673	247.0409	228.0309	215.3311	212.3443	219.8709	235.8941	256.1205	275.1305	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	92.0100	89.9908	86.2002	77.4004	71.7712	65.8861	62.4906	65.6805	69.3507	75.8422	84.1084	90.9750	(72)
Total internal gains													
	500.6008	499.4018	484.8706	456.6473	428.1163	394.9874	379.4306	381.8003	396.2111	429.1261	460.2941	487.4045	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	4.0800	36.7938	0.7600	0.8000	0.7700	63.2517	(77)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	88.7331	159.6092	240.8659	336.1272	410.8855	423.0434	401.5629	343.4769	273.4906	182.4638	107.8232	74.9397	(83)
Total gains	589.3339	659.0110	725.7365	792.7746	839.0018	818.0308	780.9935	725.2772	669.7017	611.5899	568.1173	562.3441	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.1935	39.5568	39.9194	41.7158	42.0701	43.8014	43.8014	44.1378	43.1179	42.0701	41.3596	40.6421	
alpha	3.6129	3.6371	3.6613	3.7811	3.8047	3.9201	3.9201	3.9425	3.8745	3.8047	3.7573	3.7095	
util living area													
	0.9916	0.9866	0.9749	0.9428	0.8690	0.7248	0.5712	0.6239	0.8404	0.9576	0.9864	0.9930	(86)
MIT	18.9770	19.1927	19.5638	20.1013	20.5435	20.8568	20.9577	20.9409	20.7182	20.1583	19.5226	19.0047	(87)
Th 2	19.4898	19.5013	19.5126	19.5662	19.5764	19.6240	19.6240	19.6329	19.6056	19.5764	19.5559	19.5346	(88)
util rest of house													
	0.9887	0.9818	0.9654	0.9195	0.8127	0.6117	0.4100	0.4638	0.7519	0.9356	0.9807	0.9905	(89)
MIT 2	17.7220	17.9436	18.3171	18.8750	19.2826	19.5626	19.6148	19.6182	19.4598	18.9461	18.3109	17.7810	(90)
Living area fraction										fLA = Living area / (4) =		0.3412	(91)
MIT	18.1502	18.3698	18.7425	19.2934	19.7128	20.0042	20.0730	20.0695	19.8892	19.3597	18.7243	18.1985	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.0002	18.2198	18.5925	19.1434	19.5628	19.8542	19.9230	19.9195	19.7392	19.2097	18.5743	18.0485	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9844	0.9759	0.9573	0.9107	0.8120	0.6329	0.4474	0.5003	0.7622	0.9279	0.9751	0.9868	(94)
Useful gains	580.1272	643.1472	694.7537	721.9791	681.2978	517.7441	349.4303	362.8456	510.4288	567.4806	553.9848	554.9233	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1653.3371	1592.6692	1432.7813	1161.4285	884.0038	567.3717	358.8332	377.1553	618.5967	967.9715	1312.1963	1611.6679	(97)
Space heating kWh	798.4682	638.0788	549.0925	316.4035	150.8132	0.0000	0.0000	0.0000	0.0000	297.9652	545.9123	786.2180	(98a)
Space heating requirement - total per year (kWh/year)												4082.9518	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	798.4682	638.0788	549.0925	316.4035	150.8132	0.0000	0.0000	0.0000	0.0000	297.9652	545.9123	786.2180	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4082.9518	
Space heating per m2											(98c) / (4) =	59.9464	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	798.4682	638.0788	549.0925	316.4035	150.8132	0.0000	0.0000	0.0000	0.0000	297.9652	545.9123	786.2180	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	950.5573	759.6177	653.6816	376.6709	179.5395	0.0000	0.0000	0.0000	0.0000	354.7205	649.8956	935.9738	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8885	81.7200	81.3415	80.5046	78.9476	75.0000	75.0000	75.0000	75.0000	80.3437	81.4343	81.8807	(217)
Fuel for water heating, kWh/month	266.8566	236.5351	252.6691	222.8345	218.2923	204.7716	201.2401	211.2365	215.5063	226.5702	238.6778	264.0535	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	16.9608	13.6066	12.2512	8.9757	6.9331	5.6644	6.3246	8.2210	10.6783	14.0105	15.8248	17.4322	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4860.6569	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2759.2435	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	136.8831	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7871.7835	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4860.6569	3.6400	176.9279	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2759.2435	3.6400	100.4365	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	136.8831	16.4900	22.5720	(250)
Additional standing charges			92.0000	(251)
Total energy cost			410.8999	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.3078	(257)
SAP value		78.8007	
SAP rating (Section 12)		79	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4860.6569	0.2100	1020.7380	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2759.2435	0.2100	579.4411	(264)
Space and water heating			1600.1791	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	136.8831	0.1443	19.7565	(268)
Total CO2, kg/year			1635.8875	(272)
CO2 emissions per m2			24.0200	(273)
EI value			80.6198	
EI rating			81	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		68.1100 (1b)	x	3.0100 (2b)	=	205.0111	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	205.0111	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8476	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8645	0.8465	0.8285	0.7564	0.7384	0.6664	0.6664	0.6664	0.6664	0.7564	0.7745	0.8105	(22b)
Effective ac	0.8737	0.8583	0.8432	0.7861	0.7726	0.7220	0.7220	0.7220	0.7220	0.7861	0.7999	0.8284	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			116.3300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		35.0468			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	23.2660	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	58.3128	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	59.1081	58.0656	57.0452	53.1828	52.2720	48.8485	48.8485	48.8485	48.8485	53.1828	54.1155	56.0467	(38)
Heat transfer coeff													
	117.4208	116.3784	115.3579	111.4955	110.5848	107.1613	107.1613	107.1613	107.1613	111.4955	112.4282	114.3594	(39)
Average = Sum(39)m / 12 =												111.5138	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7240	1.7087	1.6937	1.6370	1.6236	1.5734	1.5734	1.5734	1.5734	1.6370	1.6507	1.6790	(40)
HLP (average)												1.6373	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1994	(42)
Hot water usage for mixer showers													
	68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												97.0684	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)										Total = Sum(45)m =		1612.4316	
Distribution loss (46)m = 0.15 x (45)m													
	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	47.5094	47.3229	43.9627	44.7424	46.1912	46.1739	49.6968	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(64)
										Total per year (kWh/year) = Sum(64)m =		2186.2499	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.4554	60.4738	64.1329	55.7283	53.3978	47.4380	46.4930	48.8663	49.9325	56.4266	60.5580	67.6854	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.3772	17.2107	13.9967	10.5964	7.9209	6.6872	7.2257	9.3923	12.6063	16.0066	18.6820	19.9158	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	287.8303	290.8171	283.2905	267.2673	247.0409	228.0309	215.3311	212.3443	219.8709	235.8941	256.1205	275.1305	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	92.0100	89.9908	86.2002	77.4004	71.7712	65.8861	62.4906	65.6805	69.3507	75.8422	84.1084	90.9750	(72)
Total internal gains													
	500.6008	499.4018	484.8706	456.6473	428.1163	394.9874	379.4306	381.8003	396.2111	429.1261	460.2941	487.4045	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Southeast	4.0800	33.9635	0.7600	0.8000	0.7700	58.3862	(77)

Solar gains	81.9075	150.7420	238.3569	340.6089	408.7455	429.3891	395.1889	332.5381	273.4906	179.6992	101.2884	71.3711	(83)
Total gains	582.5083	650.1438	723.2275	797.2563	836.8618	824.3765	774.6195	714.3385	669.7017	608.8253	561.5826	558.7756	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	40.2813	40.6421	41.0016	42.4220	42.7714	44.1378	44.1378	44.1378	44.1378	42.4220	42.0701	41.3596	
alpha	3.6854	3.7095	3.7334	3.8281	3.8514	3.9425	3.9425	3.9425	3.9425	3.8281	3.8047	3.7573	
util living area													
	0.9913	0.9862	0.9736	0.9379	0.8565	0.7114	0.5927	0.6413	0.8351	0.9566	0.9855	0.9926	(86)
MIT	19.0956	19.2892	19.6460	20.1629	20.5964	20.8705	20.9506	20.9334	20.7368	20.1817	19.6091	19.1038	(87)
Th 2	19.5237	19.5346	19.5454	19.5863	19.5961	19.6329	19.6329	19.6329	19.6329	19.5863	19.5764	19.5559	(88)
util rest of house													
	0.9882	0.9813	0.9636	0.9128	0.7954	0.5963	0.4367	0.4832	0.7465	0.9339	0.9793	0.9899	(89)
MIT 2	17.8637	18.0629	18.4213	18.9482	19.3434	19.5789	19.6210	19.6154	19.4970	18.9760	18.4113	17.8946	(90)

Living area fraction										fLA = Living area / (4) =		0.3412	(91)
MIT	18.2840	18.4813	18.8392	19.3626	19.7709	20.0196	20.0747	20.0651	19.9201	19.3874	18.8200	18.3072	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.1340	18.3313	18.6892	19.2126	19.6209	19.8696	19.9247	19.9151	19.7701	19.2374	18.6700	18.1572	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9838	0.9754	0.9555	0.9043	0.7967	0.6185	0.4725	0.5189	0.7571	0.9264	0.9736	0.9861	(94)
Useful gains	573.0731	634.1729	691.0661	720.9893	666.6886	509.8851	365.9698	370.7037	507.0624	563.9906	546.7441	550.9902	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1577.4319	1528.2004	1383.0498	1127.5150	842.7596	553.9776	377.7086	387.4014	607.6104	951.8835	1255.8246	1550.3961	(97)
Space heating kWh	747.2429	600.7865	514.8358	292.6985	130.9968	0.0000	0.0000	0.0000	0.0000	288.5923	510.5380	743.5579	(98a)
Space heating requirement - total per year (kWh/year)												3829.2488	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	747.2429	600.7865	514.8358	292.6985	130.9968	0.0000	0.0000	0.0000	0.0000	288.5923	510.5380	743.5579	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3829.2488	
Space heating per m2											(98c) / (4) =	56.2215	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	747.2429	600.7865	514.8358	292.6985	130.9968	0.0000	0.0000	0.0000	0.0000	288.5923	510.5380	743.5579	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	889.5749	715.2221	612.8998	348.4506	155.9486	0.0000	0.0000	0.0000	0.0000	343.5623	607.7833	885.1880	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.7795	81.6160	81.2193	80.3367	78.6386	75.0000	75.0000	75.0000	75.0000	80.2741	81.3096	81.7890	(217)
Fuel for water heating, kWh/month	267.2124	236.8366	253.0494	223.3001	219.1501	204.7716	201.2401	211.2365	215.5063	226.7666	239.0436	264.3496	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	16.9608	13.6066	12.2512	8.9757	6.9331	5.6644	6.3246	8.2210	10.6783	14.0105	15.8248	17.4322	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												4558.6296	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												75.0000	
Water heating fuel used												2762.4628	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												115.0000	(230c)
Total electricity for the above, kWh/year												115.0000	(231)
Electricity for lighting (calculated in Appendix L)												136.8831	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												7572.9755	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4558.6296	5.6000	255.2833	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	2762.4628	5.6000	154.6979	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	136.8831	26.0600	35.6717	(250)
Additional standing charges			99.0000	(251)
Total energy cost			574.6219	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4558.6296	0.2100	957.3122	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2762.4628	0.2100	580.1172	(264)
Space and water heating			1537.4294	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	136.8831	0.1443	19.7565	(268)
Total CO2, kg/year			1573.1378	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4558.6296	1.1300	5151.2514	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2762.4628	1.1300	3121.5830	(278)
Space and water heating			8272.8344	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	136.8831	1.5338	209.9558	(282)
Total Primary energy kWh/year			8656.7622	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 8

Current energy efficiency rating: C 79
Current environmental impact rating: B 81

N Solar water heating — Not applicable
U Solar photovoltaic panels — Not applicable
V2 Wind turbine — Not applicable

Recommended measures: SAP change Cost change CO2 change
(none)

Recommended measures	Typical annual savings		Energy efficiency	Environmental impact
(none)				
Total Savings	£0	0.00 kg/m²		

Potential energy efficiency rating: C 79
Potential environmental impact rating: B 81

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£66	£66	£0
Mains gas	£509	£509	£0
Space heating	£384	£384	£0
Water heating	£155	£155	£0
Lighting	£36	£36	£0
Total cost of fuels	£575	£575	£0
Total cost of uses	£575	£575	£0
Delivered energy	111 kWh/m²	111 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.6 tonnes	1.6 tonnes	0.0 tonnes
CO2 emissions per m²	23 kg/m²	23 kg/m²	0 kg/m²
Primary energy	127 kWh/m²	127 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b)	= 205.0111	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					(4)
Dwelling volume					(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 205.0111	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8476	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9185	0.9005	0.8825	0.7925	0.7745	0.6844	0.6844	0.6664	0.7204	0.7745	0.8105	0.8465	(22b)
Effective ac	0.9219	0.9055	0.8894	0.8140	0.7999	0.7342	0.7342	0.7220	0.7595	0.7999	0.8284	0.8583	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			116.3300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		35.0468			(33)
Party Floor 1			68.1100					(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							23.2660	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		58.3128	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	62.3670	61.2587	60.1724	55.0701	54.1155	49.6715	49.6715	48.8485	51.3832	54.1155	56.0467	58.0656	(38)
Heat transfer coeff	120.6797	119.5715	118.4852	113.3828	112.4282	107.9842	107.9842	107.1613	109.6960	112.4282	114.3594	116.3784	(39)
Average = Sum(39)m / 12 =												113.3783	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7718	1.7556	1.7396	1.6647	1.6507	1.5854	1.5854	1.5734	1.6106	1.6507	1.6790	1.7087	(40)
HLP (average)												1.6646	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1994	(42)
Hot water usage for mixer showers	68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)
Average daily hot water use (litres/day)												97.0684	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte	167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)
Energy content (annual)										Total = Sum(45)m =		1612.4316	
Distribution loss (46)m = 0.15 x (45)m	25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	47.5094	47.3229	43.9627	44.7424	46.1912	46.1739	49.6968	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(64)
									Total per year (kWh/year) = Sum(64)m =			2186.2499	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month	68.4554	60.4738	64.1329	55.7283	53.3978	47.4380	46.4930	48.8663	49.9325	56.4266	60.5580	67.6854	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.3772	17.2107	13.9967	10.5964	7.9209	6.6872	7.2257	9.3923	12.6063	16.0066	18.6820	19.9158	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	287.8303	290.8171	283.2905	267.2673	247.0409	228.0309	215.3311	212.3443	219.8709	235.8941	256.1205	275.1305	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	92.0100	89.9908	86.2002	77.4004	71.7712	65.8861	62.4906	65.6805	69.3507	75.8422	84.1084	90.9750	(72)
Total internal gains													
	500.6008	499.4018	484.8706	456.6473	428.1163	394.9874	379.4306	381.8003	396.2111	429.1261	460.2941	487.4045	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	11.2829	0.7600	0.8000	0.7700	25.4814	(75)
Southeast	4.0800	36.7938	0.7600	0.8000	0.7700	63.2517	(77)

Solar gains	88.7331	159.6092	240.8659	336.1272	410.8855	423.0434	401.5629	343.4769	273.4906	182.4638	107.8232	74.9397	(83)
Total gains	589.3339	659.0110	725.7365	792.7746	839.0018	818.0308	780.9935	725.2772	669.7017	611.5899	568.1173	562.3441	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	39.1935	39.5568	39.9194	41.7158	42.0701	43.8014	43.8014	44.1378	43.1179	42.0701	41.3596	40.6421	
alpha	3.6129	3.6371	3.6613	3.7811	3.8047	3.9201	3.9201	3.9425	3.8745	3.8047	3.7573	3.7095	
util living area													
	0.9916	0.9866	0.9749	0.9428	0.8690	0.7248	0.5712	0.6239	0.8404	0.9576	0.9864	0.9930	(86)
MIT	18.9770	19.1927	19.5638	20.1013	20.5435	20.8568	20.9577	20.9409	20.7182	20.1583	19.5226	19.0047	(87)
Th 2	19.4898	19.5013	19.5126	19.5662	19.5764	19.6240	19.6240	19.6329	19.6056	19.5764	19.5559	19.5346	(88)
util rest of house													
	0.9887	0.9818	0.9654	0.9195	0.8127	0.6117	0.4100	0.4638	0.7519	0.9356	0.9807	0.9905	(89)
MIT 2	17.7220	17.9436	18.3171	18.8750	19.2826	19.5626	19.6148	19.6182	19.4598	18.9461	18.3109	17.7810	(90)
Living area fraction									fLA = Living area / (4) =			0.3412	(91)
MIT	18.1502	18.3698	18.7425	19.2934	19.7128	20.0042	20.0730	20.0695	19.8892	19.3597	18.7243	18.1985	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.0002	18.2198	18.5925	19.1434	19.5628	19.8542	19.9230	19.9195	19.7392	19.2097	18.5743	18.0485	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9844	0.9759	0.9573	0.9107	0.8120	0.6329	0.4474	0.5003	0.7622	0.9279	0.9751	0.9868	(94)
Useful gains	580.1272	643.1472	694.7537	721.9791	681.2978	517.7441	349.4303	362.8456	510.4288	567.4806	553.9848	554.9233	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1653.3371	1592.6692	1432.7813	1161.4285	884.0038	567.3717	358.8332	377.1553	618.5967	967.9715	1312.1963	1611.6679	(97)
Space heating kWh													
	798.4682	638.0788	549.0925	316.4035	150.8132	0.0000	0.0000	0.0000	0.0000	297.9652	545.9123	786.2180	(98a)
Space heating requirement - total per year (kWh/year)												4082.9518	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	798.4682	638.0788	549.0925	316.4035	150.8132	0.0000	0.0000	0.0000	0.0000	297.9652	545.9123	786.2180	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4082.9518	
Space heating per m2											(98c) / (4) =	59.9464	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	798.4682	638.0788	549.0925	316.4035	150.8132	0.0000	0.0000	0.0000	0.0000	297.9652	545.9123	786.2180	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	950.5573	759.6177	653.6816	376.6709	179.5395	0.0000	0.0000	0.0000	0.0000	354.7205	649.8956	935.9738	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)

Water heating

Water heating requirement

	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.8885	81.7200	81.3415	80.5046	78.9476	75.0000	75.0000	75.0000	75.0000	80.3437	81.4343	81.8807 (217)
Fuel for water heating, kWh/month												
	266.8566	236.5351	252.6691	222.8345	218.2923	204.7716	201.2401	211.2365	215.5063	226.5702	238.6778	264.0535 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	16.9608	13.6066	12.2512	8.9757	6.9331	5.6644	6.3246	8.2210	10.6783	14.0105	15.8248	17.4322 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year	
Space heating fuel - main system 1	4860.6569 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	75.0000
Water heating fuel used	2759.2435 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
central heating pump	115.0000 (230c)
Total electricity for the above, kWh/year	115.0000 (231)
Electricity for lighting (calculated in Appendix L)	136.8831 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	7871.7835 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4860.6569	3.6400	176.9279	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2759.2435	3.6400	100.4365	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	136.8831	16.4900	22.5720	(250)
Additional standing charges			92.0000	(251)
Total energy cost			410.8999	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.3078 (257)
SAP value		78.8007
SAP rating (Section 12)		79 (258)
SAP band		C

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4860.6569	0.2100	1020.7380	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2759.2435	0.2100	579.4411	(264)
Space and water heating			1600.1791	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	136.8831	0.1443	19.7565	(268)
Total CO2, kg/year			1635.8875	(272)
CO2 emissions per m2			24.0200	(273)
EI value			80.6198	
EI rating			81	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	68.1100	(1b)	x 3.0100	(2b) =	205.0111	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	68.1100					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		205.0111	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.0976 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8476 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7204 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8645	0.8465	0.8285	0.7564	0.7384	0.6664	0.6664	0.6664	0.6664	0.7564	0.7745	0.8105	(22b)
Effective ac	0.8737	0.8583	0.8432	0.7861	0.7726	0.7220	0.7220	0.7220	0.7220	0.7861	0.7999	0.8284	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			9.4400	1.3258	12.5152			(27)
External Wall 1	48.2200	9.4400	38.7800	0.3000	11.6340			(29a)
External Roof 1	68.1100		68.1100	0.1600	10.8976			(30)
Total net area of external elements Aum(A, m2)			116.3300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.0468			(33)
Party Floor 1			68.1100					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		23.2660 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	58.3128 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	59.1081	58.0656	57.0452	53.1828	52.2720	48.8485	48.8485	48.8485	48.8485	53.1828	54.1155	56.0467	(38)
Heat transfer coeff	117.4208	116.3784	115.3579	111.4955	110.5848	107.1613	107.1613	107.1613	107.1613	111.4955	112.4282	114.3594	(39)
Average = Sum(39)m / 12 =												111.5138	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7240	1.7087	1.6937	1.6370	1.6236	1.5734	1.5734	1.5734	1.5734	1.6370	1.6507	1.6790	(40)
HLP (average)												1.6373	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.1994 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
68.6491	67.6175	66.1141	63.2378	61.1151	58.7479	57.4024	58.8943	60.5298	63.0714	66.0096	68.3861	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

37.1538	35.8028	34.4517	33.1007	31.7496	30.3986	30.3986	31.7496	33.1007	34.4517	35.8028	37.1538	(42c)

Average daily hot water use (litres/day)	97.0684 (43)

Daily hot water use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
105.8030	103.4203	100.5659	96.3385	92.8647	89.1465	87.8010	90.6440	93.6305	97.5232	101.8124	105.5399	(44)
Energy conte 167.5660	147.2691	154.5660	131.8825	125.0138	109.6160	106.1877	112.2362	115.4558	132.3381	145.0504	165.2501	(45)

Energy content (annual)	Total = Sum(45)m = 1612.4316

Distribution loss (46)m = 0.15 x (45)m

25.1349	22.0904	23.1849	19.7824	18.7521	16.4424	15.9282	16.8354	17.3184	19.8507	21.7576	24.7875	(46)

Water storage loss:

Total storage loss

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)

If cylinder contains dedicated solar storage

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 50.9589	46.0274	50.9589	47.5094	47.3229	43.9627	44.7424	46.1912	46.1739	49.6968	49.3151	50.9589	(61)

Total heat required for water heating calculated for each month

218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090	(64)
									Total per year (kWh/year) = Sum(64)m =			2186.2499	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
	68.4554	60.4738	64.1329	55.7283	53.3978	47.4380	46.4930	48.8663	49.9325	56.4266	60.5580	67.6854	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	131.9628	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.3772	17.2107	13.9967	10.5964	7.9209	6.6872	7.2257	9.3923	12.6063	16.0066	18.6820	19.9158	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	287.8303	290.8171	283.2905	267.2673	247.0409	228.0309	215.3311	212.3443	219.8709	235.8941	256.1205	275.1305	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	50.3957	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	-87.9752	(71)
Water heating gains (Table 5)													
	92.0100	89.9908	86.2002	77.4004	71.7712	65.8861	62.4906	65.6805	69.3507	75.8422	84.1084	90.9750	(72)
Total internal gains													
	500.6008	499.4018	484.8706	456.6473	428.1163	394.9874	379.4306	381.8003	396.2111	429.1261	460.2941	487.4045	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	5.3600	10.4150	0.7600	0.8000	0.7700	23.5213	(75)
Southeast	4.0800	33.9635	0.7600	0.8000	0.7700	58.3862	(77)

Solar gains	81.9075	150.7420	238.3569	340.6089	408.7455	429.3891	395.1889	332.5381	273.4906	179.6992	101.2884	71.3711	(83)
Total gains	582.5083	650.1438	723.2275	797.2563	836.8618	824.3765	774.6195	714.3385	669.7017	608.8253	561.5826	558.7756	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	40.2813	40.6421	41.0016	42.4220	42.7714	44.1378	44.1378	44.1378	44.1378	42.4220	42.0701	41.3596	
alpha	3.6854	3.7095	3.7334	3.8281	3.8514	3.9425	3.9425	3.9425	3.9425	3.8281	3.8047	3.7573	
util living area													
	0.9913	0.9862	0.9736	0.9379	0.8565	0.7114	0.5927	0.6413	0.8351	0.9566	0.9855	0.9926	(86)
MIT	19.0956	19.2892	19.6460	20.1629	20.5964	20.8705	20.9506	20.9334	20.7368	20.1817	19.6091	19.1038	(87)
Th 2	19.5237	19.5346	19.5454	19.5863	19.5961	19.6329	19.6329	19.6329	19.6329	19.5863	19.5764	19.5559	(88)
util rest of house													
	0.9882	0.9813	0.9636	0.9128	0.7954	0.5963	0.4367	0.4832	0.7465	0.9339	0.9793	0.9899	(89)
MIT 2	17.8637	18.0629	18.4213	18.9482	19.3434	19.5789	19.6210	19.6154	19.4970	18.9760	18.4113	17.8946	(90)
Living area fraction									fLA = Living area / (4) =			0.3412	(91)
MIT	18.2840	18.4813	18.8392	19.3626	19.7709	20.0196	20.0747	20.0651	19.9201	19.3874	18.8200	18.3072	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.1340	18.3313	18.6892	19.2126	19.6209	19.8696	19.9247	19.9151	19.7701	19.2374	18.6700	18.1572	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9838	0.9754	0.9555	0.9043	0.7967	0.6185	0.4725	0.5189	0.7571	0.9264	0.9736	0.9861	(94)
Useful gains	573.0731	634.1729	691.0661	720.9893	666.6886	509.8851	365.9698	370.7037	507.0624	563.9906	546.7441	550.9902	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1577.4319	1528.2004	1383.0498	1127.5150	842.7596	553.9776	377.7086	387.4014	607.6104	951.8835	1255.8246	1550.3961	(97)
Space heating kWh													
	747.2429	600.7865	514.8358	292.6985	130.9968	0.0000	0.0000	0.0000	0.0000	288.5923	510.5380	743.5579	(98a)
Space heating requirement - total per year (kWh/year)												3829.2488	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	747.2429	600.7865	514.8358	292.6985	130.9968	0.0000	0.0000	0.0000	0.0000	288.5923	510.5380	743.5579	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3829.2488	
Space heating per m2											(98c) / (4) =	56.2215	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	747.2429	600.7865	514.8358	292.6985	130.9968	0.0000	0.0000	0.0000	0.0000	288.5923	510.5380	743.5579	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	889.5749	715.2221	612.8998	348.4506	155.9486	0.0000	0.0000	0.0000	0.0000	343.5623	607.7833	885.1880	(211)
Space heating efficiency (main heating system 2)													

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating												
Water heating requirement												
	218.5249	193.2965	205.5249	179.3919	172.3366	153.5787	150.9301	158.4274	161.6297	182.0348	194.3655	216.2090 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.7795	81.6160	81.2193	80.3367	78.6386	75.0000	75.0000	75.0000	75.0000	80.2741	81.3096	81.7890 (217)
Fuel for water heating, kWh/month												
	267.2124	236.8366	253.0494	223.3001	219.1501	204.7716	201.2401	211.2365	215.5063	226.7666	239.0436	264.3496 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	16.9608	13.6066	12.2512	8.9757	6.9331	5.6644	6.3246	8.2210	10.6783	14.0105	15.8248	17.4322 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4558.6296	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2762.4628	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	136.8831	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7572.9755	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4558.6296	5.6000	255.2833	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2762.4628	5.6000	154.6979	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	136.8831	26.0600	35.6717	(250)
Additional standing charges			99.0000	(251)
Total energy cost			574.6219	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4558.6296	0.2100	957.3122	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2762.4628	0.2100	580.1172	(264)
Space and water heating			1537.4294	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	136.8831	0.1443	19.7565	(268)
Total CO2, kg/year			1573.1378	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4558.6296	1.1300	5151.2514	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2762.4628	1.1300	3121.5830	(278)
Space and water heating			8272.8344	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	136.8831	1.5338	209.9558	(282)
Total Primary energy kWh/year			8656.7622	(286)

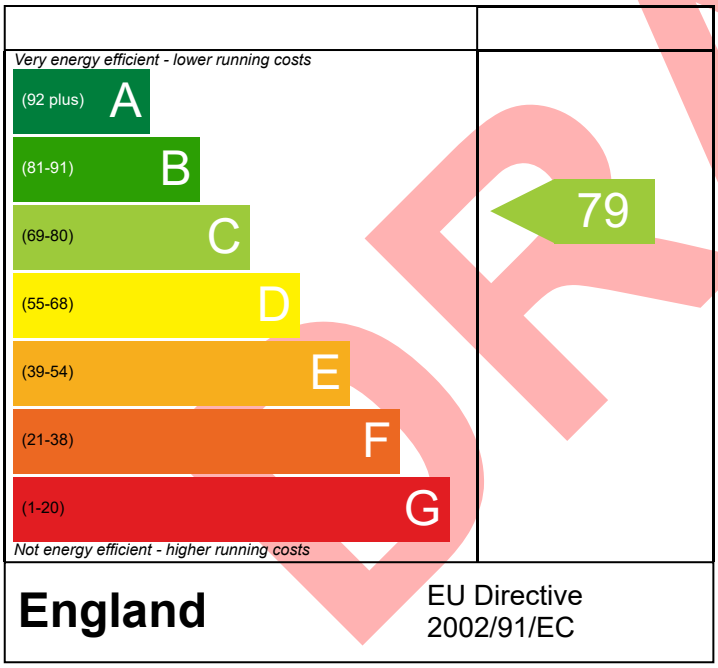
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	68.11 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

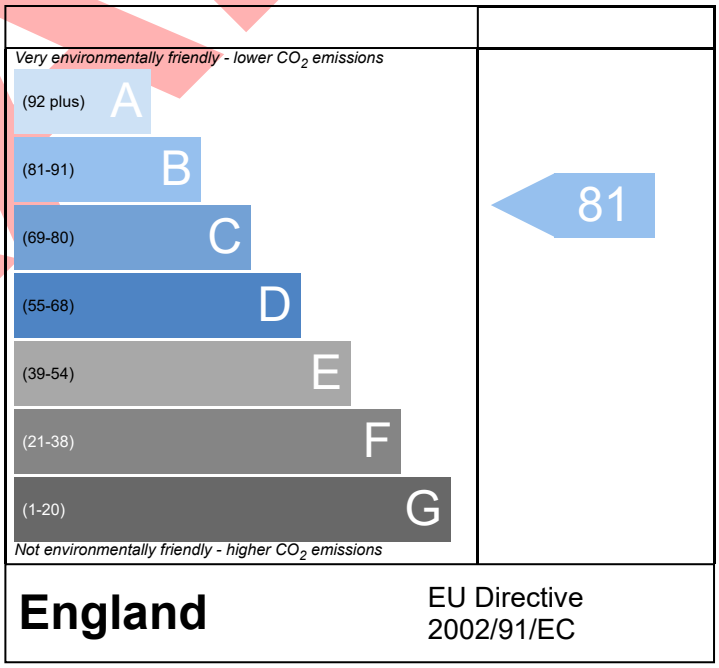
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

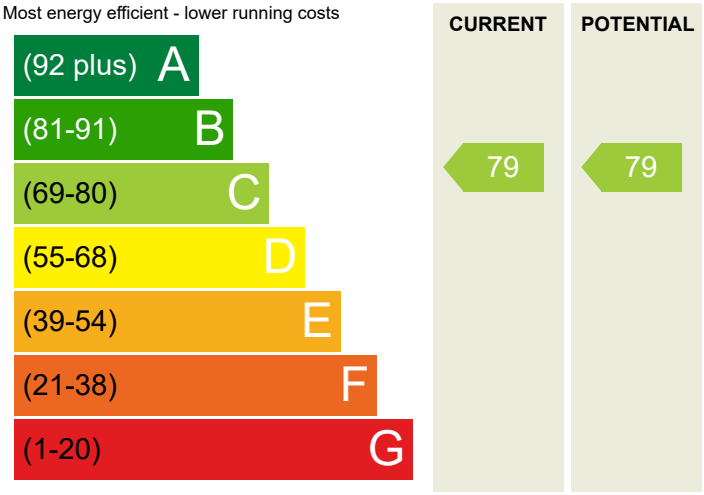
Energy Report

Dwelling Address	
Reference	Apt. 8-Apt. 8
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	68

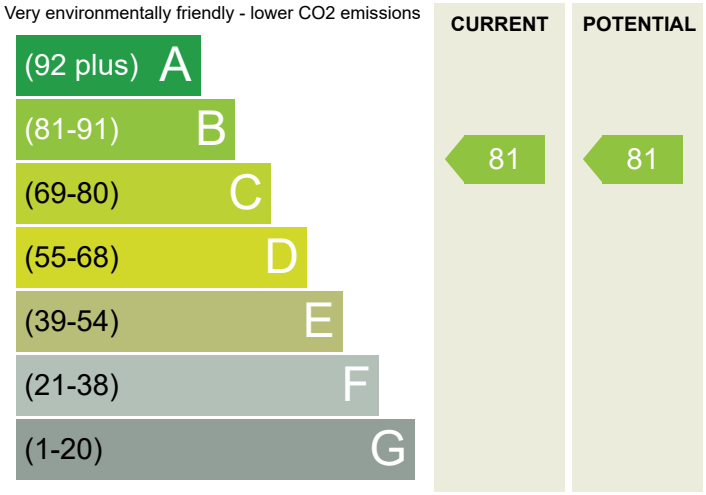
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

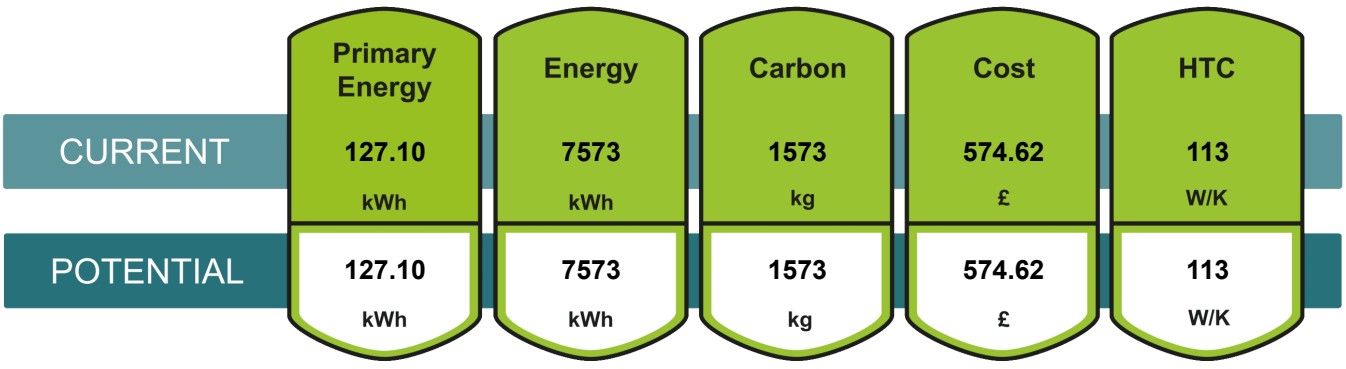
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£36	£36	You could save £0
Heating	£384	£384	
Hot Water	£155	£155	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£575	£575	

Estimated energy use and potential savings

Space Heating
4559
kWh per year

Water Heating
2762
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 8	Issued on Date	01/10/2024
Assessment Reference	Apt. 8	Prop Type Ref	Detached Flat
Property			

SAP Rating	79 C	DER	24.59	TER	
Environmental	81 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.57	DFEE	67.74	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	135.12	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	48.22	m²	

Comments

External Roofs

Dwelling Sign Off Report

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	68.11	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NE1	New Glazing	External Wall 1	North East	5.36
W SE1	New Glazing	External Wall 1	South East	4.08

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1

SAP table

Fuel Type	Mains gas	
Winter Efficiency	84.00	%
Summer Efficiency	75.00	%
Model Name		
Manufacturer		
System Type		
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Flow Temperature Value		

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2 None

Secondary Heating None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Dwelling Sign Off Report

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 9	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 9	**Prop Type Ref**	
Property			

SAP Rating	79 C	**DER**	23.89	**TER**	
Environmental	82 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.41	**DFEE**	64.01	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	131.45	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	21.77 m	62.84 m²	3.01 m

8.0 Living Area	19.79	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	48.64	37.88	0.00	None	10.76	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	62.84	62.84	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	62.84

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SW1	New Glazing	External Wall 1	South West	9.40	0
W SE1	New Glazing	External Wall 1	South East	1.36	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
20.0 Fans, Open Fireplaces, Flues		
Number of open chimneys	0	
Number of open flues	0	
Number of chimneys/flues attached to closed fire	0	
Number of flues attached to solid fuel boiler	0	
Number of flues attached to other heater	0	
Number of blocked chimneys	0	
Number of intermittent extract fans	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Designed AP_{50}	5.00	m³/(h.m²) @ 50 Pa
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	
25.0 Main Heating 2	None	

Summary for Input Data

elmhurst energy

26.0 Heat Networks None

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating None

28.0 Water Heating

Water Heating	Main Heating 1	
SAP Code	901	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
Immersion Heater	Single	
Summer Immersion	No	
Cold Water Source	From mains	
Bath Count	0	
Supplementary Immersion	No	
Immersion Only Heating Hot Water	No	

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder None

Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	

31.0 Thermal Store None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 9	Issued on Date	01/10/2024
Assessment Reference	Apt. 9	Prop Type Ref	
Property			

SAP Rating	79 C	DER	23.89	TER	
Environmental	82 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.41	DFEE	64.01	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	131.45	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	62.8400	(1b)	x 3.0100	(2b) =	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		189.1484	(5)

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2. Ventilation rate

---

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8557 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9274	0.9092	0.8910	0.8001	0.7819	0.6910	0.6910	0.6728	0.7274	0.7819	0.8183	0.8547	(22b)
Effective ac	0.9300	0.9133	0.8970	0.8201	0.8057	0.7387	0.7387	0.7263	0.7645	0.8057	0.8348	0.8652	(25)

---

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			111.4800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.6836			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		22.2960 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	57.9796 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	58.0521	57.0098	55.9881	51.1893	50.2914	46.1118	46.1118	45.3377	47.7217	50.2914	52.1078	54.0067	(38)
Heat transfer coeff	116.0317	114.9894	113.9677	109.1688	108.2710	104.0913	104.0913	103.3173	105.7012	108.2710	110.0873	111.9862	(39)
Average = Sum(39)m / 12 =												109.1645	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.8465	1.8299	1.8136	1.7373	1.7230	1.6564	1.6564	1.6441	1.6821	1.7230	1.7519	1.7821	(40)
HLP (average)												1.7372	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0607	(42)
Hot water usage for mixer showers													
	66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)
Average daily hot water use (litres/day)												93.3593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	
Distribution loss (46)m = 0.15 x (45)m													
	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.7827	49.2890	45.6940	45.5146	42.2828	43.0327	44.4261	44.4096	47.7978	48.2903	50.9589	(61)
Total heat required for water heating calculated for each month													
	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(64)
										Total per year (kWh/year) = Sum(64)m =		2109.2555	(64)
12Total per year (kWh/year)												2109	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.3264	58.5415	61.7517	53.5988	51.3574	45.6253	44.7164	46.9991	48.0245	54.2704	58.4589	65.5858	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	91.6751	101.4975	91.6751	94.7310	91.6751	94.7310	91.6751	91.6751	94.7310	91.6751	94.7310	91.6751	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	180.0485	181.9168	177.2086	167.1855	154.5332	142.6417	134.6975	132.8292	137.5373	147.5604	160.2128	172.1042	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	89.1485	87.1154	82.9995	74.4428	69.0288	63.3685	60.1027	63.1708	66.7007	72.9441	81.1929	88.1530	(72)
Total internal gains													
	421.7824	431.4400	412.7936	397.2697	376.1474	354.6515	340.3857	341.5854	352.8794	373.0900	397.0470	412.8427	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	9.4000	36.7938	0.7600	0.8000	0.7700	145.7269	(79)

Solar gains	166.8108	284.1405	388.7734	481.7091	539.5543	535.6525	516.4262	473.2711	420.9594	314.0358	199.8009	142.7553	(83)
Total gains	588.5932	715.5805	801.5670	878.9787	915.7017	890.3041	856.8119	814.8565	773.8387	687.1258	596.8479	555.5980	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6095	37.9504	38.2906	39.9738	40.3053	41.9237	41.9237	42.2377	41.2851	40.3053	39.6403	38.9681	
alpha	3.5073	3.5300	3.5527	3.6649	3.6870	3.7949	3.7949	3.8158	3.7523	3.6870	3.6427	3.5979	
util living area													
	0.9893	0.9783	0.9591	0.9116	0.8223	0.6648	0.5102	0.5497	0.7656	0.9300	0.9800	0.9912	(86)
MIT	18.9481	19.2525	19.6550	20.1992	20.6078	20.8840	20.9675	20.9572	20.7871	20.2478	19.5467	18.9644	(87)
Th 2	19.4377	19.4492	19.4605	19.5143	19.5244	19.5722	19.5722	19.5811	19.5537	19.5244	19.5039	19.4826	(88)
util rest of house													
	0.9855	0.9708	0.9444	0.8790	0.7550	0.5478	0.3562	0.3957	0.6614	0.8970	0.9718	0.9881	(89)
MIT 2	17.6568	17.9642	18.3646	18.9192	19.2838	19.5255	19.5657	19.5714	19.4532	18.9839	18.2963	17.7043	(90)
Living area fraction									fLA = Living area / (4) =			0.3149	(91)
MIT	18.0635	18.3699	18.7710	19.3223	19.7008	19.9533	20.0071	20.0078	19.8732	19.3819	18.6901	18.1012	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9135	18.2199	18.6210	19.1723	19.5508	19.8033	19.8571	19.8578	19.7232	19.2319	18.5401	17.9512	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9801	0.9625	0.9337	0.8696	0.7564	0.5685	0.3885	0.4276	0.6755	0.8884	0.9642	0.9835	(94)
Useful gains	576.8776	688.7519	748.4543	764.3640	692.6742	506.1801	332.8936	348.4598	522.7113	610.4586	575.4997	546.4466	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1579.5943	1531.6484	1381.4014	1121.4108	850.0091	541.6233	339.0407	357.2536	594.3845	934.5861	1259.4087	1539.9417	(97)
Space heating kWh	746.0212	566.4265	470.9126	257.0737	117.0571	0.0000	0.0000	0.0000	0.0000	241.1509	492.4145	739.1604	(98a)
Space heating requirement - total per year (kWh/year)												3630.2169	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	746.0212	566.4265	470.9126	257.0737	117.0571	0.0000	0.0000	0.0000	0.0000	241.1509	492.4145	739.1604	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3630.2169	
Space heating per m2											(98c) / (4) =	57.7692	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	746.0212	566.4265	470.9126	257.0737	117.0571	0.0000	0.0000	0.0000	0.0000	241.1509	492.4145	739.1604	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	888.1205	674.3172	560.6103	306.0401	139.3537	0.0000	0.0000	0.0000	0.0000	287.0844	586.2077	879.9529	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8262	81.5665	81.1191	80.1379	78.4804	75.0000	75.0000	75.0000	75.0000	79.9638	81.3063	81.8283	(217)
Fuel for water heating, kWh/month	259.2349	229.7812	244.0224	215.3003	211.2010	196.9470	193.5504	203.1648	207.2714	218.9478	230.9761	256.5059	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.2917	12.2676	11.0456	8.0925	6.2509	5.1070	5.7022	7.4120	9.6274	12.6317	14.2675	15.7167	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4321.6868	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2666.9033	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	123.4128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7227.0029	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4321.6868	0.2100	907.5542	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2666.9033	0.2100	560.0497	(264)
Space and water heating			1467.6039	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	123.4128	0.1443	17.8123	(268)
Total CO2, kg/year			1501.3681	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			23.8900	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4321.6868	1.1300	4883.5061	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2666.9033	1.1300	3013.6007	(278)
Space and water heating			7897.1068	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	123.4128	1.5338	189.2947	(282)
Total Primary energy kWh/year			8260.3735	(286)
Dwelling Primary energy Rate (DPER)			131.4500	(287)

Full SAP Calculation Printout

Property Reference	Apt. 9	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 9	**Prop Type Ref**	
Property			

SAP Rating	79 C	**DER**	23.89	**TER**	
Environmental	82 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.41	**DFEE**	64.01	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	131.45	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	62.8400	(1b)	x 3.0100	(2b) =	189.1484	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		189.1484	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8557	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9274	0.9092	0.8910	0.8001	0.7819	0.6910	0.6910	0.6728	0.7274	0.7819	0.8183	0.8547	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9300	0.9133	0.8970	0.8201	0.8057	0.7387	0.7387	0.7263	0.7645	0.8057	0.8348	0.8652	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			111.4800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		35.6836			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		22.2960	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	57.9796	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	58.0521	57.0098	55.9881	51.1893	50.2914	46.1118	46.1118	45.3377	47.7217	50.2914	52.1078	54.0067	(38)
Heat transfer coeff	116.0317	114.9894	113.9677	109.1688	108.2710	104.0913	104.0913	103.3173	105.7012	108.2710	110.0873	111.9862	(39)
Average = Sum(39)m / 12 =												109.1645	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8465	1.8299	1.8136	1.7373	1.7230	1.6564	1.6564	1.6441	1.6821	1.7230	1.7519	1.7821	(40)
HLP (average)												1.7372	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.0607 (42)

Hot water usage for mixer showers

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)

Hot water usage for baths

25.3965	25.0193	24.4882	23.5089	22.7755	21.9624	21.5232	22.0506	22.6249	23.4950	24.4945	25.3106	(42b)

Hot water usage for other uses

35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)

Average daily hot water use (litres/day) 56.0316 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	61.1300	59.4534	57.6229	55.3442	53.3115	51.1989	50.7597	52.5866	54.4602	56.6297	58.9286	61.0441	(44)
Energy conte	96.8150	84.6609	88.5642	75.7634	71.7675	62.9551	61.3895	65.1131	67.1549	76.8460	83.9546	95.5804	(45)
Energy content (annual)										Total = Sum(45)m =		930.5644	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	82.2927	71.9618	75.2796	64.3989	61.0023	53.5118	52.1811	55.3462	57.0817	65.3191	71.3614	81.2433	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	82.2927	71.9618	75.2796	64.3989	61.0023	53.5118	52.1811	55.3462	57.0817	65.3191	71.3614	81.2433	(64)
										Total per year (kWh/year) = Sum(64)m =		790.9798	(64)
12Total per year (kWh/year)												791	(64)
Electric shower(s)													
	47.0654	41.9357	45.7922	43.6989	44.5189	42.4667	43.8823	44.5189	43.6989	45.7922	44.9311	47.0654	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												535.3665	(64a)
Heat gains from water heating, kWh/month													
	32.3395	28.4744	30.2679	27.0244	26.3803	23.9946	24.0158	24.9663	25.1951	27.7778	29.0731	32.0772	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	91.6751	101.4975	91.6751	94.7310	91.6751	94.7310	91.6751	91.6751	94.7310	91.6751	94.7310	91.6751	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	180.0485	181.9168	177.2086	167.1855	154.5332	142.6417	134.6975	132.8292	137.5373	147.5604	160.2128	172.1042	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	43.4671	42.3726	40.6827	37.5340	35.4574	33.3259	32.2793	33.5568	34.9932	37.3358	40.3793	43.1145	(72)
Total internal gains													
	369.1011	379.6972	363.4768	353.3608	335.5760	324.6089	312.5623	311.9714	321.1719	330.4817	349.2334	360.8042	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	9.4000	36.7938	0.7600	0.8000	0.7700	145.7269	(79)

Solar gains	166.8108	284.1405	388.7734	481.7091	539.5543	535.6525	516.4262	473.2711	420.9594	314.0358	199.8009	142.7553	(83)
Total gains	535.9118	663.8376	752.2502	835.0699	875.1304	860.2614	828.9885	785.2425	742.1312	644.5174	549.0343	503.5595	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6095	37.9504	38.2906	39.9738	40.3053	41.9237	41.9237	42.2377	41.2851	40.3053	39.6403	38.9681	
alpha	3.5073	3.5300	3.5527	3.6649	3.6870	3.7949	3.7949	3.8158	3.7523	3.6870	3.6427	3.5979	
util living area													
	0.9920	0.9827	0.9658	0.9224	0.8381	0.6807	0.5249	0.5666	0.7827	0.9410	0.9845	0.9936	(86)
MIT	18.8714	19.1800	19.5907	20.1513	20.5775	20.8741	20.9642	20.9526	20.7691	20.1975	19.4785	18.8874	(87)
Th 2	19.4377	19.4492	19.4605	19.5143	19.5244	19.5722	19.5722	19.5811	19.5537	19.5244	19.5039	19.4826	(88)
util rest of house													
	0.9891	0.9766	0.9532	0.8926	0.7737	0.5634	0.3676	0.4097	0.6806	0.9120	0.9780	0.9913	(89)
MIT 2	17.5812	17.8937	18.3038	18.8773	19.2617	19.5209	19.5649	19.5702	19.4427	18.9398	18.2301	17.6281	(90)
Living area fraction										fLA = Living area / (4) =		0.3149	(91)
MIT	17.9875	18.2988	18.7090	19.2785	19.6761	19.9470	20.0056	20.0055	19.8604	19.3359	18.6233	18.0247	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.9875	18.2988	18.7090	19.2785	19.6761	19.9470	20.0056	20.0055	19.8604	19.3359	18.6233	18.0247	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9852	0.9702	0.9450	0.8868	0.7814	0.5970	0.4177	0.4595	0.7054	0.9072	0.9726	0.9881	(94)
Useful gains	527.9903	644.0602	710.8654	740.5154	683.8159	513.6113	346.2795	360.8155	523.5360	584.6891	533.9881	497.5513	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1588.1818	1540.7214	1391.4369	1133.0087	863.5786	556.5812	354.4955	372.5141	608.8852	945.8449	1268.5691	1548.1745	(97)
Space heating kWh													
	788.7825	602.5563	506.3452	282.5952	133.7435	0.0000	0.0000	0.0000	0.0000	268.6999	528.8983	781.6637	(98a)
Space heating requirement - total per year (kWh/year)												3893.2845	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	788.7825	602.5563	506.3452	282.5952	133.7435	0.0000	0.0000	0.0000	0.0000	268.6999	528.8983	781.6637	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3893.2845	
Space heating per m2											(98c) / (4) =	61.9555	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	978.4583	770.2757	785.2114	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7884	0.8609	0.8376	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	771.4116	663.1151	657.7197	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	970.9711	936.2412	886.8878	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	143.6828	203.2058	170.5011	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	35.9207	50.8015	42.6253	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												129.3474	(107)
Energy for space heating												61.9555	(99)
Energy for space cooling												2.0584	(108)
Total												64.0139	(109)
Fabric Energy Efficiency (DFEE)												64.0	(109)

Full SAP Calculation Printout

Property Reference	Apt. 9	Issued on Date	01/10/2024
Assessment Reference	Apt. 9	Prop Type Ref	
Property			

SAP Rating	79 C	DER	23.89	TER	
Environmental	82 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.41	DFEE	64.01	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	131.45	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	62.8400	(1b)	x 3.0100	(2b) =	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		189.1484	(5)

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2. Ventilation rate

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	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)

	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8557 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9274	0.9092	0.8910	0.8001	0.7819	0.6910	0.6910	0.6728	0.7274	0.7819	0.8183	0.8547	(22b)
Effective ac	0.9300	0.9133	0.8970	0.8201	0.8057	0.7387	0.7387	0.7263	0.7645	0.8057	0.8348	0.8652	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			111.4800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.6836			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		22.2960 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	57.9796 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	58.0521	57.0098	55.9881	51.1893	50.2914	46.1118	46.1118	45.3377	47.7217	50.2914	52.1078	54.0067	(38)
Heat transfer coeff	116.0317	114.9894	113.9677	109.1688	108.2710	104.0913	104.0913	103.3173	105.7012	108.2710	110.0873	111.9862	(39)
Average = Sum(39)m / 12 =												109.1645	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.8465	1.8299	1.8136	1.7373	1.7230	1.6564	1.6564	1.6441	1.6821	1.7230	1.7519	1.7821	(40)
HLP (average)												1.7372	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0607	(42)
Hot water usage for mixer showers													
	66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)
Average daily hot water use (litres/day)												93.3593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	
Distribution loss (46)m = 0.15 x (45)m													
	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.7827	49.2890	45.6940	45.5146	42.2828	43.0327	44.4261	44.4096	47.7978	48.2903	50.9589	(61)
Total heat required for water heating calculated for each month													
	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(64)
										Total per year (kWh/year) = Sum(64)m =		2109.2555	(64)
12Total per year (kWh/year)												2109	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.3264	58.5415	61.7517	53.5988	51.3574	45.6253	44.7164	46.9991	48.0245	54.2704	58.4589	65.5858	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	103.0344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	91.6751	101.4975	91.6751	94.7310	91.6751	94.7310	91.6751	91.6751	94.7310	91.6751	94.7310	91.6751	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	180.0485	181.9168	177.2086	167.1855	154.5332	142.6417	134.6975	132.8292	137.5373	147.5604	160.2128	172.1042	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	33.3034	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	89.1485	87.1154	82.9995	74.4428	69.0288	63.3685	60.1027	63.1708	66.7007	72.9441	81.1929	88.1530	(72)
Total internal gains													
	421.7824	431.4400	412.7936	397.2697	376.1474	354.6515	340.3857	341.5854	352.8794	373.0900	397.0470	412.8427	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	9.4000	36.7938	0.7600	0.8000	0.7700	145.7269	(79)

Solar gains	166.8108	284.1405	388.7734	481.7091	539.5543	535.6525	516.4262	473.2711	420.9594	314.0358	199.8009	142.7553	(83)
Total gains	588.5932	715.5805	801.5670	878.9787	915.7017	890.3041	856.8119	814.8565	773.8387	687.1258	596.8479	555.5980	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6095	37.9504	38.2906	39.9738	40.3053	41.9237	41.9237	42.2377	41.2851	40.3053	39.6403	38.9681	
alpha	3.5073	3.5300	3.5527	3.6649	3.6870	3.7949	3.7949	3.8158	3.7523	3.6870	3.6427	3.5979	
util living area													
	0.9893	0.9783	0.9591	0.9116	0.8223	0.6648	0.5102	0.5497	0.7656	0.9300	0.9800	0.9912	(86)
MIT	18.9481	19.2525	19.6550	20.1992	20.6078	20.8840	20.9675	20.9572	20.7871	20.2478	19.5467	18.9644	(87)
Th 2	19.4377	19.4492	19.4605	19.5143	19.5244	19.5722	19.5722	19.5811	19.5537	19.5244	19.5039	19.4826	(88)
util rest of house													
	0.9855	0.9708	0.9444	0.8790	0.7550	0.5478	0.3562	0.3957	0.6614	0.8970	0.9718	0.9881	(89)
MIT 2	17.6568	17.9642	18.3646	18.9192	19.2838	19.5255	19.5657	19.5714	19.4532	18.9839	18.2963	17.7043	(90)
Living area fraction									fLA = Living area / (4) =			0.3149	(91)
MIT	18.0635	18.3699	18.7710	19.3223	19.7008	19.9533	20.0071	20.0078	19.8732	19.3819	18.6901	18.1012	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9135	18.2199	18.6210	19.1723	19.5508	19.8033	19.8571	19.8578	19.7232	19.2319	18.5401	17.9512	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9801	0.9625	0.9337	0.8696	0.7564	0.5685	0.3885	0.4276	0.6755	0.8884	0.9642	0.9835	(94)
Useful gains	576.8776	688.7519	748.4543	764.3640	692.6742	506.1801	332.8936	348.4598	522.7113	610.4586	575.4997	546.4466	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1579.5943	1531.6484	1381.4014	1121.4108	850.0091	541.6233	339.0407	357.2536	594.3845	934.5861	1259.4087	1539.9417	(97)
Space heating kWh	746.0212	566.4265	470.9126	257.0737	117.0571	0.0000	0.0000	0.0000	0.0000	241.1509	492.4145	739.1604	(98a)
Space heating requirement - total per year (kWh/year)												3630.2169	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	746.0212	566.4265	470.9126	257.0737	117.0571	0.0000	0.0000	0.0000	0.0000	241.1509	492.4145	739.1604	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3630.2169	
Space heating per m2											(98c) / (4) =	57.7692	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	746.0212	566.4265	470.9126	257.0737	117.0571	0.0000	0.0000	0.0000	0.0000	241.1509	492.4145	739.1604	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	888.1205	674.3172	560.6103	306.0401	139.3537	0.0000	0.0000	0.0000	0.0000	287.0844	586.2077	879.9529	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.8262	81.5665	81.1191	80.1379	78.4804	75.0000	75.0000	75.0000	75.0000	79.9638	81.3063	81.8283	(217)
Fuel for water heating, kWh/month	259.2349	229.7812	244.0224	215.3003	211.2010	196.9470	193.5504	203.1648	207.2714	218.9478	230.9761	256.5059	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.2917	12.2676	11.0456	8.0925	6.2509	5.1070	5.7022	7.4120	9.6274	12.6317	14.2675	15.7167	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4321.6868	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2666.9033	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	123.4128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7227.0029	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4321.6868	0.2100	907.5542	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2666.9033	0.2100	560.0497	(264)
Space and water heating			1467.6039	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	123.4128	0.1443	17.8123	(268)
Total CO2, kg/year			1501.3681	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			23.8900	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	4321.6868	1.1300	4883.5061	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2666.9033	1.1300	3013.6007	(278)
Space and water heating			7897.1068	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	123.4128	1.5338	189.2947	(282)
Total Primary energy kWh/year			8260.3735	(286)
Dwelling Primary energy Rate (DPER)			131.4500	(287)

Full SAP Calculation Printout

Property Reference	Apt. 9	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 9	**Prop Type Ref**	
Property			

SAP Rating	79 C	**DER**	23.89	**TER**	
Environmental	82 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.41	**DFEE**	64.01	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	131.45	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		62.8400 (1b)	x	3.0100 (2b)	=	189.1484	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400						
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	189.1484	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8557	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9274	0.9092	0.8910	0.8001	0.7819	0.6910	0.6910	0.6728	0.7274	0.7819	0.8183	0.8547	(22b)
Effective ac	0.9300	0.9133	0.8970	0.8201	0.8057	0.7387	0.7387	0.7263	0.7645	0.8057	0.8348	0.8652	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			111.4800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.6836			(33)
Party Floor 1			62.8400					(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							22.2960	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		57.9796	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	58.0521	57.0098	55.9881	51.1893	50.2914	46.1118	46.1118	45.3377	47.7217	50.2914	52.1078	54.0067	(38)
Heat transfer coeff	116.0317	114.9894	113.9677	109.1688	108.2710	104.0913	104.0913	103.3173	105.7012	108.2710	110.0873	111.9862	(39)
Average = Sum(39)m / 12 =												109.1645	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

HLP	1.8465	1.8299	1.8136	1.7373	1.7230	1.6564	1.6564	1.6441	1.6821	1.7230	1.7519	1.7821	(40)
HLP (average)												1.7372	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0607	(42)
Hot water usage for mixer showers													
	66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)
Average daily hot water use (litres/day)												93.3593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	
Distribution loss (46)m = 0.15 x (45)m													
	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.7827	49.2890	45.6940	45.5146	42.2828	43.0327	44.4261	44.4096	47.7978	48.2903	50.9589	(61)
Total heat required for water heating calculated for each month													
	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(64)
										Total per year (kWh/year) = Sum(64)m =		2109.2555	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.3264	58.5415	61.7517	53.5988	51.3574	45.6253	44.7164	46.9991	48.0245	54.2704	58.4589	65.5858	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.4704	15.5170	12.6193	9.5536	7.1414	6.0291	6.5147	8.4680	11.3657	14.4314	16.8436	17.9559	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	268.7291	271.5176	264.4905	249.5307	230.6465	212.8981	201.0411	198.2525	205.2796	220.2395	239.1236	256.8720	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	89.1485	87.1154	82.9995	74.4428	69.0288	63.3685	60.1027	63.1708	66.7007	72.9441	81.1929	88.1530	(72)
Total internal gains													
	472.9865	471.7886	457.7479	431.1657	404.4553	372.9343	358.2970	360.5299	373.9846	405.2536	434.7987	460.6195	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	9.4000	36.7938	0.7600	0.8000	0.7700	145.7269	(79)

Solar gains	166.8108	284.1405	388.7734	481.7091	539.5543	535.6525	516.4262	473.2711	420.9594	314.0358	199.8009	142.7553	(83)
Total gains	639.7972	755.9291	846.5213	912.8748	944.0096	908.5868	874.7233	833.8009	794.9440	719.2893	634.5996	603.3748	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6095	37.9504	38.2906	39.9738	40.3053	41.9237	41.9237	42.2377	41.2851	40.3053	39.6403	38.9681	
alpha	3.5073	3.5300	3.5527	3.6649	3.6870	3.7949	3.7949	3.8158	3.7523	3.6870	3.6427	3.5979	
util living area													
	0.9862	0.9745	0.9524	0.9029	0.8113	0.6554	0.5012	0.5392	0.7543	0.9211	0.9759	0.9886	(86)
MIT	19.0217	19.3080	19.7120	20.2346	20.6276	20.8896	20.9694	20.9599	20.7983	20.2841	19.5996	19.0344	(87)
Th 2	19.4377	19.4492	19.4605	19.5143	19.5244	19.5722	19.5722	19.5811	19.5537	19.5244	19.5039	19.4826	(88)
util rest of house													
	0.9814	0.9659	0.9358	0.8681	0.7422	0.5386	0.3492	0.3873	0.6489	0.8851	0.9662	0.9847	(89)
MIT 2	17.7292	18.0180	18.4182	18.9498	19.2981	19.5281	19.5661	19.5721	19.4595	19.0153	18.3473	17.7733	(90)
Living area fraction										fLA = Living area / (4) =		0.3149	(91)
MIT	18.1363	18.4243	18.8256	19.3544	19.7168	19.9569	20.0080	20.0091	19.8811	19.4149	18.7417	18.1705	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9863	18.2743	18.6756	19.2044	19.5668	19.8069	19.8580	19.8591	19.7311	19.2649	18.5917	18.0205	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9750	0.9568	0.9247	0.8592	0.7445	0.5595	0.3811	0.4188	0.6637	0.8770	0.9579	0.9791	(94)
Useful gains	623.7785	723.2946	782.7713	784.3207	702.7858	508.3843	333.3741	349.1951	527.6338	630.7990	607.8909	590.7890	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1588.0403	1537.8968	1387.6298	1124.9222	851.7426	541.9909	339.1334	357.3900	595.2143	938.1553	1265.0852	1547.7054	(97)
Space heating kWh	717.4107	547.4127	450.0148	245.2331	110.8238	0.0000	0.0000	0.0000	0.0000	228.6731	473.1799	711.9458	(98a)
Space heating requirement - total per year (kWh/year)												3484.6938	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	717.4107	547.4127	450.0148	245.2331	110.8238	0.0000	0.0000	0.0000	0.0000	228.6731	473.1799	711.9458	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3484.6938	
Space heating per m2											(98c) / (4) =	55.4534	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	717.4107	547.4127	450.0148	245.2331	110.8238	0.0000	0.0000	0.0000	0.0000	228.6731	473.1799	711.9458	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	854.0604	651.6818	535.7319	291.9442	131.9331	0.0000	0.0000	0.0000	0.0000	272.2298	563.3094	847.5545	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.7610	81.5054	81.0295	80.0336	78.3644	75.0000	75.0000	75.0000	75.0000	79.8452	81.2305	81.7659	(217)
Fuel for water heating, kWh/month	259.4414	229.9534	244.2923	215.5809	211.5138	196.9470	193.5504	203.1648	207.2714	219.2730	231.1916	256.7017	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.2917	12.2676	11.0456	8.0925	6.2509	5.1070	5.7022	7.4120	9.6274	12.6317	14.2675	15.7167	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	4148.4450	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2668.8817	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	123.4128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	7055.7396	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4148.4450	3.6400	151.0034	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2668.8817	3.6400	97.1473	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	123.4128	16.4900	20.3508	(250)
Additional standing charges			92.0000	(251)
Total energy cost			379.4650	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.2668	(257)
SAP value		79.4658	
SAP rating (Section 12)		79	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4148.4450	0.2100	871.1735	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2668.8817	0.2100	560.4652	(264)
Space and water heating			1431.6386	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	123.4128	0.1443	17.8123	(268)
Total CO2, kg/year			1465.4028	(272)
CO2 emissions per m2			23.3200	(273)
EI value			81.7912	
EI rating			82	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		62.8400 (1b)	x	3.0100 (2b)	=	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	189.1484	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8557	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8729	0.8547	0.8365	0.7637	0.7456	0.6728	0.6728	0.6728	0.6728	0.7637	0.7819	0.8183	(22b)
Effective ac	0.8809	0.8652	0.8499	0.7917	0.7779	0.7263	0.7263	0.7263	0.7263	0.7917	0.8057	0.8348	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			111.4800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		35.6836			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		22.2960	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	57.9796	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.9871	54.0067	53.0469	49.4142	48.5576	45.3377	45.3377	45.3377	45.3377	49.4142	50.2914	52.1078	(38)
Heat transfer coeff													
	112.9666	111.9862	111.0264	107.3937	106.5372	103.3173	103.3173	103.3173	103.3173	107.3937	108.2710	110.0873	(39)
Average = Sum(39)m / 12 =												107.4109	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7977	1.7821	1.7668	1.7090	1.6954	1.6441	1.6441	1.6441	1.6441	1.7090	1.7230	1.7519	(40)
HLP (average)												1.7093	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0607	(42)
Hot water usage for mixer showers													
	66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)
Average daily hot water use (litres/day)												93.3593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	
Distribution loss (46)m = 0.15 x (45)m													
	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.7827	49.2890	45.6940	45.5146	42.2828	43.0327	44.4261	44.4096	47.7978	48.2903	50.9589	(61)
Total heat required for water heating calculated for each month													
	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(64)
										Total per year (kWh/year) = Sum(64)m =		2109.2555	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.3264	58.5415	61.7517	53.5988	51.3574	45.6253	44.7164	46.9991	48.0245	54.2704	58.4589	65.5858	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.4704	15.5170	12.6193	9.5536	7.1414	6.0291	6.5147	8.4680	11.3657	14.4314	16.8436	17.9559	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	268.7291	271.5176	264.4905	249.5307	230.6465	212.8981	201.0411	198.2525	205.2796	220.2395	239.1236	256.8720	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	89.1485	87.1154	82.9995	74.4428	69.0288	63.3685	60.1027	63.1708	66.7007	72.9441	81.1929	88.1530	(72)
Total internal gains													
	472.9865	471.7886	457.7479	431.1657	404.4553	372.9343	358.2970	360.5299	373.9846	405.2536	434.7987	460.6195	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)
Southwest	9.4000	33.9635	0.7600	0.8000	0.7700	134.5171	(79)

Solar gains	153.9792	268.3549	384.7237	488.1319	536.7441	543.6873	508.2290	458.1987	420.9594	309.2776	187.6917	135.9574	(83)
Total gains	626.9656	740.1435	842.4716	919.2975	941.1994	916.6216	866.5260	818.7286	794.9440	714.5312	622.4904	596.5769	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.6299	38.9681	39.3050	40.6345	40.9612	42.2377	42.2377	42.2377	42.2377	40.6345	40.3053	39.6403	
alpha	3.5753	3.5979	3.6203	3.7090	3.7307	3.8158	3.8158	3.8158	3.8158	3.7090	3.6870	3.6427	
util living area													
	0.9859	0.9742	0.9500	0.8950	0.7959	0.6411	0.5220	0.5573	0.7472	0.9197	0.9749	0.9881	(86)
MIT	19.1335	19.3964	19.7926	20.2953	20.6745	20.9010	20.9641	20.9542	20.8139	20.3049	19.6796	19.1306	(87)
Th 2	19.4716	19.4826	19.4933	19.5344	19.5442	19.5811	19.5811	19.5811	19.5811	19.5344	19.5244	19.5039	(88)
util rest of house													
	0.9809	0.9654	0.9326	0.8579	0.7224	0.5234	0.3734	0.4055	0.6426	0.8829	0.9645	0.9839	(89)
MIT 2	17.8638	18.1289	18.5199	19.0204	19.3521	19.5427	19.5732	19.5702	19.4943	19.0423	18.4408	17.8839	(90)

Living area fraction										fLA = Living area / (4) =		0.3149	(91)
MIT	18.2637	18.5280	18.9207	19.4219	19.7685	19.9704	20.0112	20.0061	19.9099	19.4399	18.8310	18.2765	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.1137	18.3780	18.7707	19.2719	19.6185	19.8204	19.8612	19.8561	19.7599	19.2899	18.6810	18.1265	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9746	0.9566	0.9217	0.8498	0.7267	0.5449	0.4043	0.4369	0.6576	0.8751	0.9562	0.9783	(94)
Useful gains	611.0145	707.9883	776.4671	781.1822	684.0031	499.4692	350.3284	357.6793	522.7176	625.2723	595.2497	583.6188	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1515.2985	1475.7590	1340.1659	1092.4011	811.6578	529.0289	357.6009	367.4033	584.7616	922.5010	1210.5737	1489.0983	(97)
Space heating kWh													
	672.7872	515.9419	419.3919	224.0776	94.9750	0.0000	0.0000	0.0000	0.0000	221.1381	443.0333	673.6767	(98a)
Space heating requirement - total per year (kWh/year)												3265.0218	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	672.7872	515.9419	419.3919	224.0776	94.9750	0.0000	0.0000	0.0000	0.0000	221.1381	443.0333	673.6767	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3265.0218	
Space heating per m2											(98c) / (4) =	51.9577	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	672.7872	515.9419	419.3919	224.0776	94.9750	0.0000	0.0000	0.0000	0.0000	221.1381	443.0333	673.6767	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	800.9372	614.2165	499.2761	266.7591	113.0655	0.0000	0.0000	0.0000	0.0000	263.2597	527.4206	801.9961	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.6513	81.3972	80.8876	79.8325	78.0461	75.0000	75.0000	75.0000	75.0000	79.7702	81.1027	81.6718	(217)
Fuel for water heating, kWh/month													
	259.7901	230.2590	244.7208	216.1239	212.3764	196.9470	193.5504	203.1648	207.2714	219.4792	231.5559	256.9974	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	15.2917	12.2676	11.0456	8.0925	6.2509	5.1070	5.7022	7.4120	9.6274	12.6317	14.2675	15.7167	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												3886.9308	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												75.0000	
Water heating fuel used												2672.2363	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												115.0000	(230c)
Total electricity for the above, kWh/year												115.0000	(231)
Electricity for lighting (calculated in Appendix L)												123.4128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												6797.5799	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3886.9308	5.6000	217.6681	(240)
Total CO2 associated with community systems			0.0000	(473)

Water heating (other fuel)	2672.2363	5.6000	149.6452	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	123.4128	26.0600	32.1614	(250)
Additional standing charges			99.0000	(251)
Total energy cost			528.4437	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3886.9308	0.2100	816.2555	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2672.2363	0.2100	561.1696	(264)
Space and water heating			1377.4251	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	123.4128	0.1443	17.8123	(268)
Total CO2, kg/year			1411.1893	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3886.9308	1.1300	4392.2318	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2672.2363	1.1300	3019.6271	(278)
Space and water heating			7411.8588	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	123.4128	1.5338	189.2947	(282)
Total Primary energy kWh/year			7775.1255	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 9

Current energy efficiency rating: C 79
Current environmental impact rating: B 82

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

Recommended measures	Typical annual savings	Energy efficiency	Environmental impact
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: C 79
Potential environmental impact rating: B 82

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£62	£62	£0
Mains gas	£466	£466	£0
Space heating	£347	£347	£0
Water heating	£150	£150	£0
Lighting	£32	£32	£0
Total cost of fuels	£528	£528	£0
Total cost of uses	£529	£529	£0
Delivered energy	108 kWh/m²	108 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.4 tonnes	1.4 tonnes	0.0 tonnes
CO2 emissions per m²	22 kg/m²	22 kg/m²	0 kg/m²
Primary energy	124 kWh/m²	124 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

		Area (m2)		Storey height (m)		Volume (m3)	
Ground floor		62.8400 (1b)	x	3.0100 (2b)	=	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	189.1484	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8557	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9274	0.9092	0.8910	0.8001	0.7819	0.6910	0.6910	0.6728	0.7274	0.7819	0.8183	0.8547	(22b)
Effective ac	0.9300	0.9133	0.8970	0.8201	0.8057	0.7387	0.7387	0.7263	0.7645	0.8057	0.8348	0.8652	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			111.4800					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		35.6836			(33)
Party Floor 1			62.8400					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	22.2960	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	57.9796	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	58.0521	57.0098	55.9881	51.1893	50.2914	46.1118	46.1118	45.3377	47.7217	50.2914	52.1078	54.0067	(38)
Heat transfer coeff	116.0317	114.9894	113.9677	109.1688	108.2710	104.0913	104.0913	103.3173	105.7012	108.2710	110.0873	111.9862	(39)
Average = Sum(39)m / 12 =												109.1645	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.8465	1.8299	1.8136	1.7373	1.7230	1.6564	1.6564	1.6441	1.6821	1.7230	1.7519	1.7821	(40)
HLP (average)												1.7372	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.0607	(42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)

Average daily hot water use (litres/day)	93.3593 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	

Distribution loss (46)m = 0.15 x (45)m

24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)

Water storage loss:

Total storage loss

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)

If cylinder contains dedicated solar storage

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 50.9589	45.7827	49.2890	45.6940	45.5146	42.2828	43.0327	44.4261	44.4096	47.7978	48.2903	50.9589	(61)

Total heat required for water heating calculated for each month

212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)

Output from w/h

212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(64)

Total per year (kWh/year) = Sum(64)m =	2109.2555 (64)

Electric shower(s)

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000 (64a)

Heat gains from water heating, kWh/month

66.3264	58.5415	61.7517	53.5988	51.3574	45.6253	44.7164	46.9991	48.0245	54.2704	58.4589	65.5858	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.4704	15.5170	12.6193	9.5536	7.1414	6.0291	6.5147	8.4680	11.3657	14.4314	16.8436	17.9559	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	268.7291	271.5176	264.4905	249.5307	230.6465	212.8981	201.0411	198.2525	205.2796	220.2395	239.1236	256.8720	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	89.1485	87.1154	82.9995	74.4428	69.0288	63.3685	60.1027	63.1708	66.7007	72.9441	81.1929	88.1530	(72)
Total internal gains													
	472.9865	471.7886	457.7479	431.1657	404.4553	372.9343	358.2970	360.5299	373.9846	405.2536	434.7987	460.6195	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	36.7938	0.7600	0.8000	0.7700	21.0839	(77)
Southwest	9.4000	36.7938	0.7600	0.8000	0.7700	145.7269	(79)

Solar gains	166.8108	284.1405	388.7734	481.7091	539.5543	535.6525	516.4262	473.2711	420.9594	314.0358	199.8009	142.7553	(83)
Total gains	639.7972	755.9291	846.5213	912.8748	944.0096	908.5868	874.7233	833.8009	794.9440	719.2893	634.5996	603.3748	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6095	37.9504	38.2906	39.9738	40.3053	41.9237	41.9237	42.2377	41.2851	40.3053	39.6403	38.9681	
alpha	3.5073	3.5300	3.5527	3.6649	3.6870	3.7949	3.7949	3.8158	3.7523	3.6870	3.6427	3.5979	
util living area													
	0.9862	0.9745	0.9524	0.9029	0.8113	0.6554	0.5012	0.5392	0.7543	0.9211	0.9759	0.9886	(86)
MIT	19.0217	19.3080	19.7120	20.2346	20.6276	20.8896	20.9694	20.9599	20.7983	20.2841	19.5996	19.0344	(87)
Th 2	19.4377	19.4492	19.4605	19.5143	19.5244	19.5722	19.5722	19.5811	19.5537	19.5244	19.5039	19.4826	(88)
util rest of house													
	0.9814	0.9659	0.9358	0.8681	0.7422	0.5386	0.3492	0.3873	0.6489	0.8851	0.9662	0.9847	(89)
MIT 2	17.7292	18.0180	18.4182	18.9498	19.2981	19.5281	19.5661	19.5721	19.4595	19.0153	18.3473	17.7733	(90)
Living area fraction										fLA = Living area / (4) =		0.3149	(91)
MIT	18.1363	18.4243	18.8256	19.3544	19.7168	19.9569	20.0080	20.0091	19.8811	19.4149	18.7417	18.1705	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9863	18.2743	18.6756	19.2044	19.5668	19.8069	19.8580	19.8591	19.7311	19.2649	18.5917	18.0205	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9750	0.9568	0.9247	0.8592	0.7445	0.5595	0.3811	0.4188	0.6637	0.8770	0.9579	0.9791	(94)
Useful gains	623.7785	723.2946	782.7713	784.3207	702.7858	508.3843	333.3741	349.1951	527.6338	630.7990	607.8909	590.7890	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1588.0403	1537.8968	1387.6298	1124.9222	851.7426	541.9909	339.1334	357.3900	595.2143	938.1553	1265.0852	1547.7054	(97)
Space heating kWh													
	717.4107	547.4127	450.0148	245.2331	110.8238	0.0000	0.0000	0.0000	0.0000	228.6731	473.1799	711.9458	(98a)
Space heating requirement - total per year (kWh/year)												3484.6938	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	717.4107	547.4127	450.0148	245.2331	110.8238	0.0000	0.0000	0.0000	0.0000	228.6731	473.1799	711.9458	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3484.6938	
Space heating per m2											(98c) / (4) =	55.4534	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	717.4107	547.4127	450.0148	245.2331	110.8238	0.0000	0.0000	0.0000	0.0000	228.6731	473.1799	711.9458	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	854.0604	651.6818	535.7319	291.9442	131.9331	0.0000	0.0000	0.0000	0.0000	272.2298	563.3094	847.5545	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)

Water heating

Water heating requirement

	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.7610	81.5054	81.0295	80.0336	78.3644	75.0000	75.0000	75.0000	75.0000	79.8452	81.2305	81.7659 (217)
Fuel for water heating, kWh/month												
	259.4414	229.9534	244.2923	215.5809	211.5138	196.9470	193.5504	203.1648	207.2714	219.2730	231.1916	256.7017 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	15.2917	12.2676	11.0456	8.0925	6.2509	5.1070	5.7022	7.4120	9.6274	12.6317	14.2675	15.7167 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year

Space heating fuel - main system 1	4148.4450 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	75.0000
Water heating fuel used	2668.8817 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
central heating pump	115.0000 (230c)
Total electricity for the above, kWh/year	115.0000 (231)
Electricity for lighting (calculated in Appendix L)	123.4128 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (233)
Wind generation	0.0000 (234)
Hydro-electric generation (Appendix N)	0.0000 (235a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (235)
Appendix Q - special features	
Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	7055.7396 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	4148.4450	3.6400	151.0034	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2668.8817	3.6400	97.1473	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	123.4128	16.4900	20.3508	(250)
Additional standing charges			92.0000	(251)
Total energy cost			379.4650	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.2668	(257)
SAP value		79.4658	
SAP rating (Section 12)		79	(258)
SAP band		C	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	4148.4450	0.2100	871.1735	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2668.8817	0.2100	560.4652	(264)
Space and water heating			1431.6386	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	123.4128	0.1443	17.8123	(268)
Total CO2, kg/year			1465.4028	(272)
CO2 emissions per m2			23.3200	(273)
EI value			81.7912	
EI rating			82	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	62.8400	(1b)	x 3.0100	(2b) =	189.1484	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.8400					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		189.1484	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1057 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8557 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7274 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.8729	0.8547	0.8365	0.7637	0.7456	0.6728	0.6728	0.6728	0.6728	0.7637	0.7819	0.8183	(22b)
Effective ac	0.8809	0.8652	0.8499	0.7917	0.7779	0.7263	0.7263	0.7263	0.7263	0.7917	0.8057	0.8348	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			10.7600	1.3258	14.2652			(27)
External Wall 1	48.6400	10.7600	37.8800	0.3000	11.3640			(29a)
External Roof 1	62.8400		62.8400	0.1600	10.0544			(30)
Total net area of external elements Aum(A, m2)			111.4800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.6836			(33)
Party Floor 1			62.8400					(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							22.2960	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		57.9796	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	54.9871	54.0067	53.0469	49.4142	48.5576	45.3377	45.3377	45.3377	45.3377	49.4142	50.2914	52.1078	(38)
Heat transfer coeff	112.9666	111.9862	111.0264	107.3937	106.5372	103.3173	103.3173	103.3173	103.3173	107.3937	108.2710	110.0873	(39)
Average = Sum(39)m / 12 =												107.4109	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7977	1.7821	1.7668	1.7090	1.6954	1.6441	1.6441	1.6441	1.6441	1.7090	1.7230	1.7519	(40)
HLP (average)												1.7093	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0607	(42)
Hot water usage for mixer showers	66.0266	65.0343	63.5884	60.8219	58.7803	56.5036	55.2095	56.6444	58.2174	60.6620	63.4879	65.7736	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	35.7335	34.4341	33.1347	31.8353	30.5359	29.2365	29.2365	30.5359	31.8353	33.1347	34.4341	35.7335	(42c)
Average daily hot water use (litres/day)												93.3593	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	101.7601	99.4684	96.7231	92.6572	89.3162	85.7401	84.4460	87.1803	90.0527	93.7967	97.9220	101.5071	(44)
Energy conte	161.1631	141.6417	148.6598	126.8431	120.2368	105.4274	102.1301	107.9475	111.0440	127.2812	139.5078	158.9356	(45)
Energy content (annual)										Total = Sum(45)m =		1550.8181	
Distribution loss (46)m = 0.15 x (45)m	24.1745	21.2463	22.2990	19.0265	18.0355	15.8141	15.3195	16.1921	16.6566	19.0922	20.9262	23.8403	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	45.7827	49.2890	45.6940	45.5146	42.2828	43.0327	44.4261	44.4096	47.7978	48.2903	50.9589	(61)
Total heat required for water heating calculated for each month	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													

	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945	(64)
									Total per year (kWh/year) = Sum(64)m =			2109.2555	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
									Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			0.0000	(64a)
Heat gains from water heating, kWh/month													
	66.3264	58.5415	61.7517	53.5988	51.3574	45.6253	44.7164	46.9991	48.0245	54.2704	58.4589	65.5858	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	123.6413	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	17.4704	15.5170	12.6193	9.5536	7.1414	6.0291	6.5147	8.4680	11.3657	14.4314	16.8436	17.9559	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	268.7291	271.5176	264.4905	249.5307	230.6465	212.8981	201.0411	198.2525	205.2796	220.2395	239.1236	256.8720	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	49.4248	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	-82.4275	(71)
Water heating gains (Table 5)													
	89.1485	87.1154	82.9995	74.4428	69.0288	63.3685	60.1027	63.1708	66.7007	72.9441	81.1929	88.1530	(72)
Total internal gains													
	472.9865	471.7886	457.7479	431.1657	404.4553	372.9343	358.2970	360.5299	373.9846	405.2536	434.7987	460.6195	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	1.3600	33.9635	0.7600	0.8000	0.7700	19.4621	(77)
Southwest	9.4000	33.9635	0.7600	0.8000	0.7700	134.5171	(79)

Solar gains	153.9792	268.3549	384.7237	488.1319	536.7441	543.6873	508.2290	458.1987	420.9594	309.2776	187.6917	135.9574	(83)
Total gains	626.9656	740.1435	842.4716	919.2975	941.1994	916.6216	866.5260	818.7286	794.9440	714.5312	622.4904	596.5769	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	38.6299	38.9681	39.3050	40.6345	40.9612	42.2377	42.2377	42.2377	42.2377	40.6345	40.3053	39.6403	
alpha	3.5753	3.5979	3.6203	3.7090	3.7307	3.8158	3.8158	3.8158	3.8158	3.7090	3.6870	3.6427	
util living area													
	0.9859	0.9742	0.9500	0.8950	0.7959	0.6411	0.5220	0.5573	0.7472	0.9197	0.9749	0.9881	(86)
MIT	19.1335	19.3964	19.7926	20.2953	20.6745	20.9010	20.9641	20.9542	20.8139	20.3049	19.6796	19.1306	(87)
Th 2	19.4716	19.4826	19.4933	19.5344	19.5442	19.5811	19.5811	19.5811	19.5811	19.5344	19.5244	19.5039	(88)
util rest of house													
	0.9809	0.9654	0.9326	0.8579	0.7224	0.5234	0.3734	0.4055	0.6426	0.8829	0.9645	0.9839	(89)
MIT 2	17.8638	18.1289	18.5199	19.0204	19.3521	19.5427	19.5732	19.5702	19.4943	19.0423	18.4408	17.8839	(90)
Living area fraction									fLA = Living area / (4) =			0.3149	(91)
MIT	18.2637	18.5280	18.9207	19.4219	19.7685	19.9704	20.0112	20.0061	19.9099	19.4399	18.8310	18.2765	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.1137	18.3780	18.7707	19.2719	19.6185	19.8204	19.8612	19.8561	19.7599	19.2899	18.6810	18.1265	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9746	0.9566	0.9217	0.8498	0.7267	0.5449	0.4043	0.4369	0.6576	0.8751	0.9562	0.9783	(94)
Useful gains	611.0145	707.9883	776.4671	781.1822	684.0031	499.4692	350.3284	357.6793	522.7176	625.2723	595.2497	583.6188	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1515.2985	1475.7590	1340.1659	1092.4011	811.6578	529.0289	357.6009	367.4033	584.7616	922.5010	1210.5737	1489.0983	(97)
Space heating kWh													
	672.7872	515.9419	419.3919	224.0776	94.9750	0.0000	0.0000	0.0000	0.0000	221.1381	443.0333	673.6767	(98a)
Space heating requirement - total per year (kWh/year)												3265.0218	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	672.7872	515.9419	419.3919	224.0776	94.9750	0.0000	0.0000	0.0000	0.0000	221.1381	443.0333	673.6767	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3265.0218	
Space heating per m2											(98c) / (4) =	51.9577	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	672.7872	515.9419	419.3919	224.0776	94.9750	0.0000	0.0000	0.0000	0.0000	221.1381	443.0333	673.6767	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	800.9372	614.2165	499.2761	266.7591	113.0655	0.0000	0.0000	0.0000	0.0000	263.2597	527.4206	801.9961	(211)
Space heating efficiency (main heating system 2)													

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating												
Water heating requirement												
	212.1220	187.4244	197.9489	172.5371	165.7514	147.7102	145.1628	152.3736	155.4536	175.0790	187.7981	209.8945 (64)
Efficiency of water heater												75.0000 (216)
(217)m	81.6513	81.3972	80.8876	79.8325	78.0461	75.0000	75.0000	75.0000	75.0000	79.7702	81.1027	81.6718 (217)
Fuel for water heating, kWh/month												
	259.7901	230.2590	244.7208	216.1239	212.3764	196.9470	193.5504	203.1648	207.2714	219.4792	231.5559	256.9974 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671 (231)
Lighting	15.2917	12.2676	11.0456	8.0925	6.2509	5.1070	5.7022	7.4120	9.6274	12.6317	14.2675	15.7167 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3886.9308	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2672.2363	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	123.4128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6797.5799	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3886.9308	5.6000	217.6681	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2672.2363	5.6000	149.6452	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	123.4128	26.0600	32.1614	(250)
Additional standing charges			99.0000	(251)
Total energy cost			528.4437	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3886.9308	0.2100	816.2555	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2672.2363	0.2100	561.1696	(264)
Space and water heating			1377.4251	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	123.4128	0.1443	17.8123	(268)
Total CO2, kg/year			1411.1893	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3886.9308	1.1300	4392.2318	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2672.2363	1.1300	3019.6271	(278)
Space and water heating			7411.8588	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	123.4128	1.5338	189.2947	(282)
Total Primary energy kWh/year			7775.1255	(286)

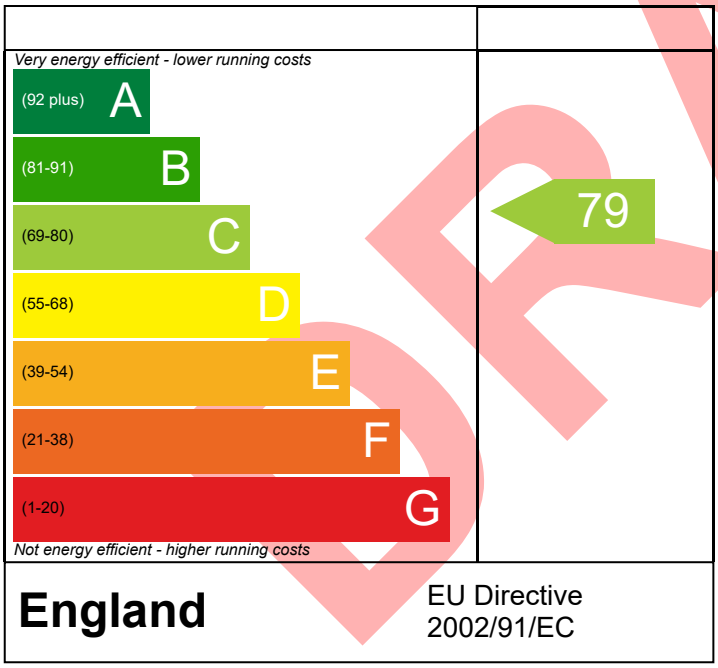
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	62.84 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

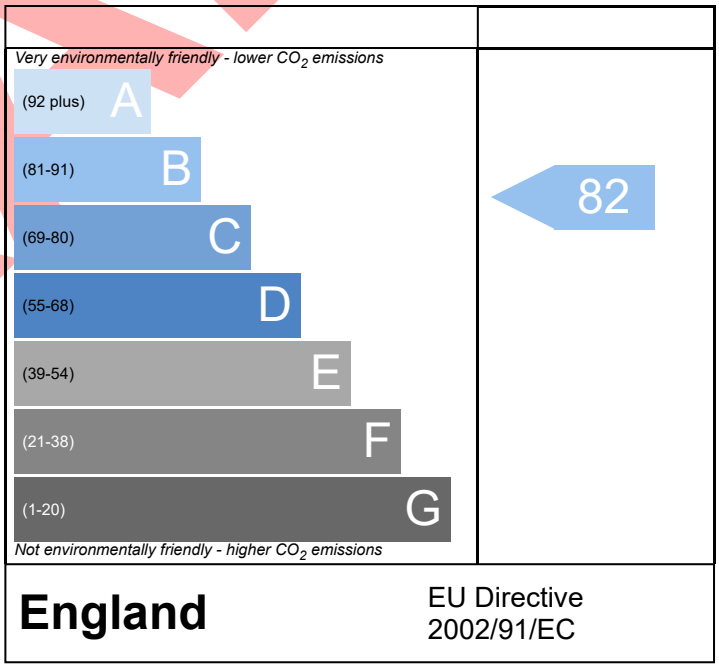
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

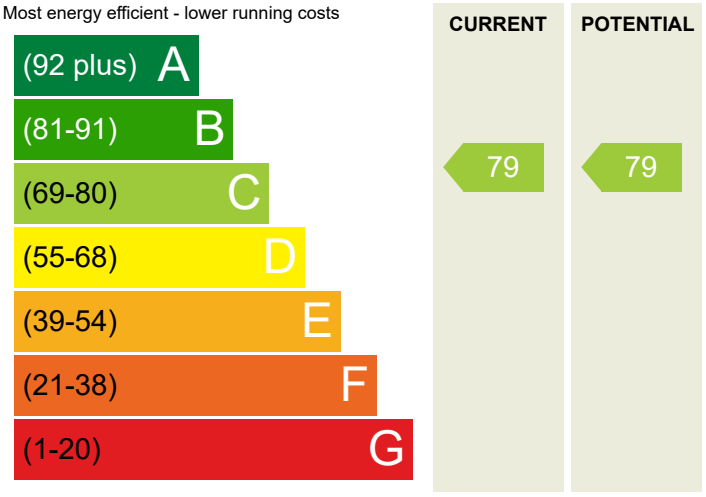
Energy Report

Dwelling Address	
Reference	Apt. 9-Apt. 9
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	63

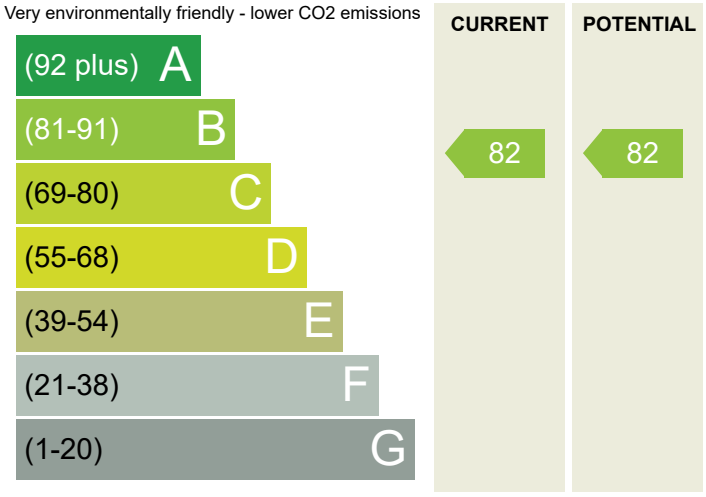
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

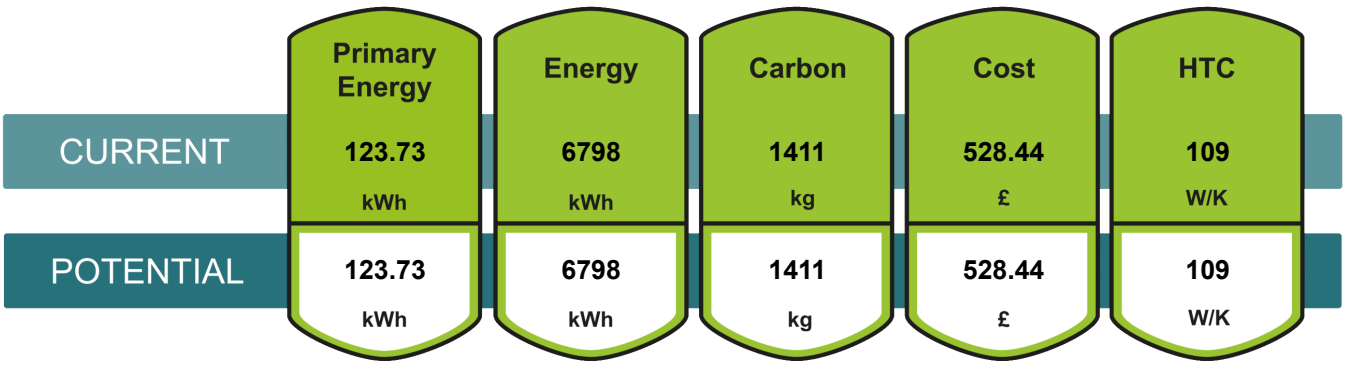
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.3 W/m²K	Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£32	£32	
Heating	£347	£347	
Hot Water	£150	£150	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£528	£528	

Estimated energy use and potential savings

Space Heating
3887
kWh per year

Water Heating
2672
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

elmhurst energy

Property Reference	Apt. 9	Issued on Date	01/10/2024
Assessment Reference	Apt. 9	Prop Type Ref	Detached Flat
Property			

SAP Rating	79 C	DER	23.89	TER	
Environmental	82 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.41	DFEE	64.01	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	131.45	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northeast (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	48.64	m²	

Comments

External Roofs

Dwelling Sign Off Report

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	62.84	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SW1	New Glazing	External Wall 1	South West	9.40
W SE1	New Glazing	External Wall 1	South East	1.36

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Designed AP_{50} 5.00 m³/(h.m²) @ 50 Pa

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System

No

Comments

Lighting

No Fixed Lighting: No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1

SAP table

Fuel Type	Mains gas	
Winter Efficiency	84.00	%
Summer Efficiency	75.00	%
Model Name		
Manufacturer		
System Type		
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Flow Temperature Value		

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2 None

Secondary Heating None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Dwelling Sign Off Report

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 10	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 10	**Prop Type Ref**	
Property			

SAP Rating	82 B	**DER**	18.51	**TER**	
Environmental	85 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.23	**DFEE**	45.52	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	102.52	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northwest	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	27.53 m	70.46 m²	2.12 m

8.0 Living Area	20.19	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	10.89	9.71	0.00	None	1.18	Enter Gross Area
Dormer Wall 1	Timber Frame	Other	0.18	0.00	15.30	10.32	0.00	None	4.98	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	37.11	37.11	None	0.00	Enter Gross Area	0.00
Dormer Roof 1	External Flat Roof	Other	0.16	0.00	13.92	13.92	None	0.00	Enter Gross Area	0.00
Slope Roof 1	External Slope Roof	Other	0.16	0.00	21.08	21.08	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	70.46

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)

Summary for Input Data

New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W SE1	New Glazing	Dormer Wall 1	South East	4.98	0
W SW1	New Glazing	External Wall 1	South West	1.18	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0
21.0 Fixed Cooling System	No
22.0 Pressure Testing	No
Property Tested?	Yes
Test Method	Blower Door

22.0 Lighting

No Fixed Lighting	No

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	

Summary for Input Data

elmhurst energy

25.0 Main Heating 2	None
26.0 Heat Networks	None

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

Property Reference	Apt. 10	Issued on Date	01/10/2024
Assessment Reference	Apt. 10	Prop Type Ref	
Property			

SAP Rating	82 B	DER	18.51	TER	
Environmental	85 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.23	DFEE	45.52	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	102.52	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600	(1b)	x 2.1200	(2b) =	149.3752	(1b) - (3b) (4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		149.3752	(5)

2. Ventilation rate

	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8839	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9579	0.9391	0.9204	0.8264	0.8077	0.7137	0.7137	0.6950	0.7513	0.8077	0.8452	0.8828	(22b)
Effective ac	0.9588	0.9410	0.9235	0.8415	0.8262	0.7547	0.7547	0.7415	0.7822	0.8262	0.8572	0.8897	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			98.3000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		24.4749			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.6600	(36)
Point Thermal bridges	(36a) = 0.0000	
Total fabric heat loss	(33) + (36) + (36a) = 44.1349	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	47.2630	46.3848	45.5240	41.4807	40.7243	37.2027	37.2027	36.5506	38.5592	40.7243	42.2546	43.8545	(38)
Heat transfer coeff	91.3979	90.5197	89.6589	85.6156	84.8591	81.3376	81.3376	80.6855	82.6940	84.8591	86.3895	87.9894	(39)

Average = Sum(39)m / 12 = 85.6120

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2972	1.2847	1.2725	1.2151	1.2044	1.1544	1.1544	1.1451	1.1736	1.2044	1.2261	1.2488	(40)
HLP (average)												1.2150	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.2572 (42)

Hot water usage for mixer showers

69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464	(42c)

Average daily hot water use (litres/day) 98.6159 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	
Distribution loss (46)m = 0.15 x (45)m	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	48.2668	48.0773	44.6635	45.4557	46.9275	46.9100	50.4890	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
										Total per year (kWh/year) = Sum(64)m =		2217.1455	(64)
12Total per year (kWh/year)												2217	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	69.3436	61.2544	64.9522	56.6167	54.2490	48.1942	47.2342	49.6453	50.7285	57.3261	61.3269	68.5613	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	115.5555	127.9365	115.5555	119.4074	115.5555	119.4074	115.5555	115.5555	119.4074	115.5555	119.4074	115.5555	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	198.3683	200.4267	195.2395	184.1966	170.2568	157.1554	148.4029	146.3445	151.5317	162.5746	176.5144	189.6157	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)
Water heating gains (Table 5)	93.2038	91.1524	87.3014	78.6343	72.9154	66.9364	63.4868	66.7276	70.4563	77.0512	85.1762	92.1523	(72)
Total internal gains	470.9862	483.3742	461.9550	446.0968	422.5863	400.3578	384.3038	385.4862	398.2540	419.0400	444.9566	461.1822	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	36.7938	0.7600	0.8000	0.7700	77.2042	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	95.4976	162.6678	222.5691	275.7740	308.8898	306.6561	295.6492	270.9433	240.9953	179.7826	114.3841	81.7261	(83)
Total gains	566.4839	646.0420	684.5242	721.8708	731.4762	707.0139	679.9530	656.4295	639.2493	598.8225	559.3407	542.9082	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	53.5358	54.0552	54.5741	57.1514	57.6609	60.1574	60.1574	60.6436	59.1706	57.6609	56.6395	55.6096	
alpha	4.5691	4.6037	4.6383	4.8101	4.8441	5.0105	5.0105	5.0429	4.9447	4.8441	4.7760	4.7073	
util living area	0.9932	0.9867	0.9752	0.9392	0.8588	0.6865	0.5161	0.5511	0.7813	0.9452	0.9859	0.9943	(86)
MIT	19.5721	19.7825	20.0587	20.4618	20.7574	20.9465	20.9894	20.9857	20.8922	20.5232	20.0256	19.5976	(87)
Th 2	19.8431	19.8528	19.8625	19.9079	19.9165	19.9567	19.9567	19.9642	19.9412	19.9165	19.8992	19.8812	(88)
util rest of house	0.9909	0.9824	0.9666	0.9176	0.8084	0.5941	0.3990	0.4342	0.6987	0.9213	0.9806	0.9924	(89)
MIT 2	18.5699	18.7853	19.0642	19.4868	19.7570	19.9329	19.9541	19.9603	19.8860	19.5567	19.0630	18.6243	(90)
Living area fraction									fLA = Living area / (4) =			0.2865	(91)
MIT	18.8571	19.0711	19.3492	19.7662	20.0437	20.2233	20.2508	20.2541	20.1743	19.8336	19.3388	18.9032	(92)
Temperature adjustment												-0.1500	

adjusted MIT	18.7071	18.9211	19.1992	19.6162	19.8937	20.0733	20.1008	20.1041	20.0243	19.6836	19.1888	18.7532	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9878	0.9776	0.9601	0.9105	0.8072	0.6052	0.4156	0.4506	0.7059	0.9149	0.9758	0.9898	(94)
Useful gains	559.5794	631.5469	657.1995	657.2609	590.4543	427.8737	282.6203	295.7624	451.2516	547.8391	545.8062	537.3596	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1316.7774	1269.1817	1138.5931	917.4739	695.3064	445.1882	284.7438	298.8683	489.9057	770.8269	1044.3465	1280.5284	(97)
Space heating kWh	563.3553	428.4905	358.1568	187.3533	78.0099	0.0000	0.0000	0.0000	0.0000	165.9029	358.9490	552.9176	(98a)
Space heating requirement - total per year (kWh/year)												2693.1355	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	563.3553	428.4905	358.1568	187.3533	78.0099	0.0000	0.0000	0.0000	0.0000	165.9029	358.9490	552.9176	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2693.1355	
Space heating per m2											(98c) / (4) =	38.2222	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	563.3553	428.4905	358.1568	187.3533	78.0099	0.0000	0.0000	0.0000	0.0000	165.9029	358.9490	552.9176	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	670.6611	510.1078	426.3772	223.0397	92.8690	0.0000	0.0000	0.0000	0.0000	197.5034	427.3202	658.2353	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.2511	80.9548	80.4532	79.3072	77.5614	75.0000	75.0000	75.0000	75.0000	79.0027	80.5773	81.2357	(217)
Fuel for water heating, kWh/month	272.2380	241.6708	258.5217	229.8046	225.7360	208.0359	204.4482	214.6040	218.9418	234.0892	244.0858	269.3929	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	19.2750	15.4631	13.9228	10.2005	7.8791	6.4373	7.1876	9.3427	12.1353	15.9222	17.9840	19.8107	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3206.1137	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2821.5691	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	155.5605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6298.2432	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3206.1137	0.2100	673.2839	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2821.5691	0.2100	592.5295	(264)
Space and water heating			1265.8134	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)

Energy for lighting	155.5605	0.1443	22.4522	(268)
Total CO2, kg/year			1304.2175	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			18.5100	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3206.1137	1.1300	3622.9084	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2821.5691	1.1300	3188.3730	(278)
Space and water heating			6811.2815	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	155.5605	1.5338	238.6039	(282)
Total Primary energy kWh/year			7223.8574	(286)
Dwelling Primary energy Rate (DPER)			102.5200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 10	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 10	**Prop Type Ref**	
Property			

SAP Rating	82 B	**DER**	18.51	**TER**	
Environmental	85 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.23	**DFEE**	45.52	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	102.52	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600	(1b)	x 2.1200	(2b) =	149.3752	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		149.3752	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	3 * 10 =	30.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.2008	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9508	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8082	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	1.0305	1.0103	0.9901	0.8890	0.8688	0.7678	0.7678	0.7476	0.8082	0.8688	0.9092	0.9496	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	1.0305	1.0103	0.9901	0.8952	0.8774	0.7948	0.7948	0.7794	0.8266	0.8774	0.9134	0.9509	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			98.3000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		24.4749			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		19.6600	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	44.1349	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	50.7958	49.7998	48.8062	44.1273	43.2519	39.1767	39.1767	38.4220	40.7464	43.2519	45.0228	46.8743	(38)

Heat transfer coeff

	94.9306	93.9346	92.9411	88.2622	87.3867	83.3116	83.3116	82.5569	84.8813	87.3867	89.1577	91.0091 (39)
Average = Sum(39)m / 12 =												88.2558

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3473	1.3332	1.3191	1.2527	1.2402	1.1824	1.1824	1.1717	1.2047	1.2402	1.2654	1.2916	(40)
HLP (average)												1.2526	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.2572 (42)

Hot water usage for mixer showers

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)

Hot water usage for baths

	26.8137	26.4155	25.8547	24.8207	24.0465	23.1880	22.7243	23.2811	23.8875	24.8061	25.8613	26.7231 (42b)

Hot water usage for other uses

	37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464 (42c)

Average daily hot water use (litres/day) 59.1754 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	64.5601	62.7893	60.8559	58.4493	56.3025	54.0714	53.6077	55.5372	57.5161	59.8073	62.2352	64.4695	(44)
Energy conte	102.2474	89.4111	93.5333	80.0142	75.7940	66.4871	64.8339	68.7666	70.9231	81.1579	88.6654	100.9436	(45)
Energy content (annual)										Total = Sum(45)m =		982.7776	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	86.9103	75.9994	79.5033	68.0121	64.4249	56.5141	55.1088	58.4516	60.2846	68.9842	75.3656	85.8021	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	86.9103	75.9994	79.5033	68.0121	64.4249	56.5141	55.1088	58.4516	60.2846	68.9842	75.3656	85.8021	(64)
										Total per year (kWh/year) = Sum(64)m =		835.3609	(64)
12Total per year (kWh/year)												835	(64)
Electric shower(s)													
	49.7046	44.2872	48.3600	46.1493	47.0153	44.8480	46.3430	47.0153	46.1493	48.3600	47.4506	49.7046	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		565.3874	(64a)
Heat gains from water heating, kWh/month													
	34.1537	30.0717	31.9658	28.5404	27.8601	25.3405	25.3629	26.3667	26.6085	29.3361	30.7040	33.8767	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	115.5555	127.9365	115.5555	119.4074	115.5555	119.4074	115.5555	115.5555	119.4074	115.5555	119.4074	115.5555	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	198.3683	200.4267	195.2395	184.1966	170.2568	157.1554	148.4029	146.3445	151.5317	162.5746	176.5144	189.6157	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)
Water heating gains (Table 5)													
	45.9056	44.7495	42.9648	39.6394	37.4463	35.1952	34.0900	35.4392	36.9562	39.4302	42.6445	45.5332	(72)
Total internal gains													
	416.6880	429.9713	410.6185	400.1019	380.1173	368.6166	354.9070	354.1977	364.7539	374.4189	395.4249	407.5630	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	36.7938	0.7600	0.8000	0.7700	77.2042	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	95.4976	162.6678	222.5691	275.7740	308.8898	306.6561	295.6492	270.9433	240.9953	179.7826	114.3841	81.7261	(83)
Total gains	512.1856	592.6391	633.1876	675.8759	689.0071	675.2727	650.5562	625.1410	605.7492	554.2015	509.8090	489.2891	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	51.5435	52.0900	52.6469	55.4378	55.9931	58.7320	58.7320	59.2689	57.6459	55.9931	54.8809	53.7644	
alpha	4.4362	4.4727	4.5098	4.6959	4.7329	4.9155	4.9155	4.9513	4.8431	4.7329	4.6587	4.5843	
util living area													
	0.9955	0.9907	0.9821	0.9537	0.8861	0.7205	0.5483	0.5862	0.8146	0.9601	0.9905	0.9963	(86)
MIT	19.4206	19.6379	19.9288	20.3677	20.6974	20.9294	20.9851	20.9798	20.8611	20.4361	19.9058	19.4554	(87)
Th 2	19.8040	19.8149	19.8259	19.8781	19.8879	19.9341	19.9341	19.9427	19.9163	19.8879	19.8681	19.8474	(88)
util rest of house													
	0.9939	0.9876	0.9757	0.9361	0.8408	0.6267	0.4232	0.4620	0.7347	0.9413	0.9868	0.9951	(89)
MIT 2	18.3901	18.6139	18.9098	19.3759	19.6841	19.9020	19.9304	19.9372	19.8430	19.4539	18.9214	18.4574	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)

MIT	18.6854	18.9073	19.2018	19.6601	19.9744	20.1964	20.2326	20.2359	20.1347	19.7354	19.2035	18.7434	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6854	18.9073	19.2018	19.6601	19.9744	20.1964	20.2326	20.2359	20.1347	19.7354	19.2035	18.7434	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9919	0.9843	0.9711	0.9318	0.8449	0.6515	0.4594	0.4978	0.7528	0.9380	0.9837	0.9934	(94)
Useful gains	508.0363	583.3260	614.9109	629.7823	582.1245	439.9375	298.8362	311.1986	456.0321	519.8377	501.5143	486.0565	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1365.6131	1315.7745	1180.5156	949.7075	723.0766	466.2464	302.6393	316.6830	512.2350	798.3087	1079.1194	1323.5821	(97)
Space heating kWh													
	638.0372	492.2054	420.8099	230.3462	104.8684	0.0000	0.0000	0.0000	0.0000	207.1824	415.8756	623.1190	(98a)
Space heating requirement - total per year (kWh/year)												3132.4440	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	638.0372	492.2054	420.8099	230.3462	104.8684	0.0000	0.0000	0.0000	0.0000	207.1824	415.8756	623.1190	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3132.4440	
Space heating per m2											(98c) / (4) =	44.4571	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	783.1287	616.5055	627.4324	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8031	0.8829	0.8640	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	628.9251	544.3119	542.0778	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	734.2409	708.0213	680.6968	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	75.8274	121.7997	103.1325	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	18.9568	30.4499	25.7831	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												75.1899	(107)
Energy for space heating												44.4571	(99)
Energy for space cooling												1.0671	(108)
Total												45.5242	(109)
Fabric Energy Efficiency (DFEE)												45.5	(109)

Full SAP Calculation Printout

Property Reference	Apt. 10	Issued on Date	01/10/2024
Assessment Reference	Apt. 10	Prop Type Ref	
Property			

SAP Rating	82 B	DER	18.51	TER	
Environmental	85 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.23	DFEE	45.52	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	102.52	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

---

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600	(1b)	x 2.1200	(2b) =	149.3752	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	149.3752	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8839	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9579	0.9391	0.9204	0.8264	0.8077	0.7137	0.7137	0.6950	0.7513	0.8077	0.8452	0.8828	(22b)
Effective ac	0.9588	0.9410	0.9235	0.8415	0.8262	0.7547	0.7547	0.7415	0.7822	0.8262	0.8572	0.8897	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			98.3000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		24.4749			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		19.6600	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	44.1349	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	47.2630	46.3848	45.5240	41.4807	40.7243	37.2027	37.2027	36.5506	38.5592	40.7243	42.2546	43.8545	(38)
Heat transfer coeff	91.3979	90.5197	89.6589	85.6156	84.8591	81.3376	81.3376	80.6855	82.6940	84.8591	86.3895	87.9894	(39)

Average = Sum(39)m / 12 = 85.6120

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2972	1.2847	1.2725	1.2151	1.2044	1.1544	1.1544	1.1451	1.1736	1.2044	1.2261	1.2488	(40)
HLP (average)												1.2150	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.2572 (42)

Hot water usage for mixer showers

69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464	(42c)

Average daily hot water use (litres/day) 98.6159 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	
Distribution loss (46)m = 0.15 x (45)m	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	48.2668	48.0773	44.6635	45.4557	46.9275	46.9100	50.4890	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
										Total per year (kWh/year) = Sum(64)m =		2217.1455	(64)
12Total per year (kWh/year)												2217	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	69.3436	61.2544	64.9522	56.6167	54.2490	48.1942	47.2342	49.6453	50.7285	57.3261	61.3269	68.5613	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	112.8620	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	115.5555	127.9365	115.5555	119.4074	115.5555	119.4074	115.5555	115.5555	119.4074	115.5555	119.4074	115.5555	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	198.3683	200.4267	195.2395	184.1966	170.2568	157.1554	148.4029	146.3445	151.5317	162.5746	176.5144	189.6157	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	34.2862	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)
Water heating gains (Table 5)	93.2038	91.1524	87.3014	78.6343	72.9154	66.9364	63.4868	66.7276	70.4563	77.0512	85.1762	92.1523	(72)
Total internal gains	470.9862	483.3742	461.9550	446.0968	422.5863	400.3578	384.3038	385.4862	398.2540	419.0400	444.9566	461.1822	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	36.7938	0.7600	0.8000	0.7700	77.2042	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	95.4976	162.6678	222.5691	275.7740	308.8898	306.6561	295.6492	270.9433	240.9953	179.7826	114.3841	81.7261	(83)
Total gains	566.4839	646.0420	684.5242	721.8708	731.4762	707.0139	679.9530	656.4295	639.2493	598.8225	559.3407	542.9082	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	53.5358	54.0552	54.5741	57.1514	57.6609	60.1574	60.1574	60.6436	59.1706	57.6609	56.6395	55.6096	
alpha	4.5691	4.6037	4.6383	4.8101	4.8441	5.0105	5.0105	5.0429	4.9447	4.8441	4.7760	4.7073	
util living area	0.9932	0.9867	0.9752	0.9392	0.8588	0.6865	0.5161	0.5511	0.7813	0.9452	0.9859	0.9943	(86)
MIT	19.5721	19.7825	20.0587	20.4618	20.7574	20.9465	20.9894	20.9857	20.8922	20.5232	20.0256	19.5976	(87)
Th 2	19.8431	19.8528	19.8625	19.9079	19.9165	19.9567	19.9567	19.9642	19.9412	19.9165	19.8992	19.8812	(88)
util rest of house	0.9909	0.9824	0.9666	0.9176	0.8084	0.5941	0.3990	0.4342	0.6987	0.9213	0.9806	0.9924	(89)
MIT 2	18.5699	18.7853	19.0642	19.4868	19.7570	19.9329	19.9541	19.9603	19.8860	19.5567	19.0630	18.6243	(90)
Living area fraction									fLA = Living area / (4) =			0.2865	(91)
MIT	18.8571	19.0711	19.3492	19.7662	20.0437	20.2233	20.2508	20.2541	20.1743	19.8336	19.3388	18.9032	(92)
Temperature adjustment												-0.1500	

adjusted MIT	18.7071	18.9211	19.1992	19.6162	19.8937	20.0733	20.1008	20.1041	20.0243	19.6836	19.1888	18.7532	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9878	0.9776	0.9601	0.9105	0.8072	0.6052	0.4156	0.4506	0.7059	0.9149	0.9758	0.9898	(94)
Useful gains	559.5794	631.5469	657.1995	657.2609	590.4543	427.8737	282.6203	295.7624	451.2516	547.8391	545.8062	537.3596	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1316.7774	1269.1817	1138.5931	917.4739	695.3064	445.1882	284.7438	298.8683	489.9057	770.8269	1044.3465	1280.5284	(97)
Space heating kWh	563.3553	428.4905	358.1568	187.3533	78.0099	0.0000	0.0000	0.0000	0.0000	165.9029	358.9490	552.9176	(98a)
Space heating requirement - total per year (kWh/year)												2693.1355	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	563.3553	428.4905	358.1568	187.3533	78.0099	0.0000	0.0000	0.0000	0.0000	165.9029	358.9490	552.9176	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2693.1355	
Space heating per m2											(98c) / (4) =	38.2222	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	563.3553	428.4905	358.1568	187.3533	78.0099	0.0000	0.0000	0.0000	0.0000	165.9029	358.9490	552.9176	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	670.6611	510.1078	426.3772	223.0397	92.8690	0.0000	0.0000	0.0000	0.0000	197.5034	427.3202	658.2353	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.2511	80.9548	80.4532	79.3072	77.5614	75.0000	75.0000	75.0000	75.0000	79.0027	80.5773	81.2357	(217)
Fuel for water heating, kWh/month	272.2380	241.6708	258.5217	229.8046	225.7360	208.0359	204.4482	214.6040	218.9418	234.0892	244.0858	269.3929	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	19.2750	15.4631	13.9228	10.2005	7.8791	6.4373	7.1876	9.3427	12.1353	15.9222	17.9840	19.8107	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3206.1137	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2821.5691	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	155.5605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6298.2432	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3206.1137	0.2100	673.2839	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2821.5691	0.2100	592.5295	(264)
Space and water heating			1265.8134	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)

Energy for lighting	155.5605	0.1443	22.4522	(268)
Total CO2, kg/year			1304.2175	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			18.5100	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	3206.1137	1.1300	3622.9084	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2821.5691	1.1300	3188.3730	(278)
Space and water heating			6811.2815	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	155.5605	1.5338	238.6039	(282)
Total Primary energy kWh/year			7223.8574	(286)
Dwelling Primary energy Rate (DPER)			102.5200	(287)

Full SAP Calculation Printout

Property Reference	Apt. 10	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 10	**Prop Type Ref**	
Property			

SAP Rating	82 B	**DER**	18.51	**TER**	
Environmental	85 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.23	**DFEE**	45.52	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	102.52	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600 (1b)	x	2.1200 (2b)	=	149.3752	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	149.3752	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8839	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9579	0.9391	0.9204	0.8264	0.8077	0.7137	0.7137	0.6950	0.7513	0.8077	0.8452	0.8828	(22b)
Effective ac	0.9588	0.9410	0.9235	0.8415	0.8262	0.7547	0.7547	0.7415	0.7822	0.8262	0.8572	0.8897	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			98.3000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		24.4749			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		19.6600	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	44.1349	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	47.2630	46.3848	45.5240	41.4807	40.7243	37.2027	37.2027	36.5506	38.5592	40.7243	42.2546	43.8545	(38)
Heat transfer coeff	91.3979	90.5197	89.6589	85.6156	84.8591	81.3376	81.3376	80.6855	82.6940	84.8591	86.3895	87.9894	(39)

Average = Sum(39)m / 12 = 85.6120

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2972	1.2847	1.2725	1.2151	1.2044	1.1544	1.1544	1.1451	1.1736	1.2044	1.2261	1.2488	(40)
HLP (average)												1.2150	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.2572 (42)

Hot water usage for mixer showers

69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464	(42c)

Average daily hot water use (litres/day) 98.6159 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	
Distribution loss (46)m = 0.15 x (45)m													
	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	48.2668	48.0773	44.6635	45.4557	46.9275	46.9100	50.4890	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month													
	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
									Total per year (kWh/year) = Sum(64)m =			2217.1455	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month													
	69.3436	61.2544	64.9522	56.6167	54.2490	48.1942	47.2342	49.6453	50.7285	57.3261	61.3269	68.5613	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.0212	19.5590	15.9065	12.0422	9.0017	7.5996	8.2117	10.6738	14.3264	18.1906	21.2312	22.6332	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	296.0721	299.1444	291.4023	274.9202	254.1147	234.5603	221.4969	218.4246	226.1667	242.6487	263.4543	283.0086	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)
Water heating gains (Table 5)													
	93.2038	91.1524	87.3014	78.6343	72.9154	66.9364	63.4868	66.7276	70.4563	77.0512	85.1762	92.1523	(72)
Total internal gains													
	514.2426	512.8013	497.5556	468.5423	438.9772	405.0419	389.1408	391.7715	406.8948	440.8361	472.8071	500.7396	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	36.7938	0.7600	0.8000	0.7700	77.2042	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	95.4976	162.6678	222.5691	275.7740	308.8898	306.6561	295.6492	270.9433	240.9953	179.7826	114.3841	81.7261	(83)
Total gains	609.7402	675.4691	720.1248	744.3162	747.8671	711.6980	684.7900	662.7148	647.8902	620.6186	587.1913	582.4657	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	53.5358	54.0552	54.5741	57.1514	57.6609	60.1574	60.1574	60.6436	59.1706	57.6609	56.6395	55.6096	
alpha	4.5691	4.6037	4.6383	4.8101	4.8441	5.0105	5.0105	5.0429	4.9447	4.8441	4.7760	4.7073	
util living area													
	0.9909	0.9842	0.9701	0.9328	0.8504	0.6831	0.5128	0.5464	0.7749	0.9382	0.9830	0.9924	(86)
MIT	19.6336	19.8231	20.1049	20.4863	20.7692	20.9477	20.9897	20.9862	20.8962	20.5476	20.0642	19.6547	(87)
Th 2	19.8431	19.8528	19.8625	19.9079	19.9165	19.9567	19.9567	19.9642	19.9412	19.9165	19.8992	19.8812	(88)
util rest of house													
	0.9879	0.9792	0.9601	0.9095	0.7986	0.5908	0.3963	0.4303	0.6917	0.9121	0.9766	0.9900	(89)
MIT 2	18.6307	18.8250	19.1084	19.5087	19.7659	19.9335	19.9542	19.9604	19.8883	19.5783	19.1005	18.6808	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	18.9181	19.1110	19.3940	19.7888	20.0534	20.2241	20.2509	20.2544	20.1771	19.8560	19.3766	18.9599	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.7681	18.9610	19.2440	19.6388	19.9034	20.0741	20.1009	20.1044	20.0271	19.7060	19.2266	18.8099	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9841	0.9739	0.9531	0.9025	0.7979	0.6019	0.4128	0.4465	0.6993	0.9058	0.9713	0.9867	(94)
Useful gains	600.0487	657.8091	686.3333	671.7421	596.7065	428.3435	282.6955	295.9061	453.0461	562.1271	570.3426	574.7115	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1322.3536	1272.7999	1142.6113	919.4114	696.1301	445.2494	284.7553	298.8895	490.1396	772.7294	1047.6112	1285.5157	(97)
Space heating kWh	537.3948	413.2738	339.4709	178.3219	73.9712	0.0000	0.0000	0.0000	0.0000	156.6881	343.6334	528.8383	(98a)
Space heating requirement - total per year (kWh/year)												2571.5925	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	537.3948	413.2738	339.4709	178.3219	73.9712	0.0000	0.0000	0.0000	0.0000	156.6881	343.6334	528.8383	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2571.5925	
Space heating per m2											(98c) / (4) =	36.4972	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	537.3948	413.2738	339.4709	178.3219	73.9712	0.0000	0.0000	0.0000	0.0000	156.6881	343.6334	528.8383	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	639.7557	491.9927	404.1320	212.2880	88.0609	0.0000	0.0000	0.0000	0.0000	186.5335	409.0874	629.5695	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.1602	80.8815	80.3374	79.1964	77.4651	75.0000	75.0000	75.0000	75.0000	78.8761	80.4844	81.1497	(217)
Fuel for water heating, kWh/month	272.5429	241.8898	258.8942	230.1262	226.0165	208.0359	204.4482	214.6040	218.9418	234.4649	244.3678	269.6784	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	19.2750	15.4631	13.9228	10.2005	7.8791	6.4373	7.1876	9.3427	12.1353	15.9222	17.9840	19.8107	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3061.4196	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2824.0107	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	155.5605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6155.9908	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3061.4196	3.6400	111.4357	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2824.0107	3.6400	102.7940	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	155.5605	16.4900	25.6519	(250)

Additional standing charges	92.0000	(251)
Total energy cost	350.8451	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):	0.3600	(256)
Energy cost factor (ECF) [(255) x (256)] / [(4) + 45.0] =	1.0939	(257)
SAP value	82.2675	
SAP rating (Section 12)	82	(258)
SAP band	B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3061.4196	0.2100	642.8981	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2824.0107	0.2100	593.0422	(264)
Space and water heating			1235.9404	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	155.5605	0.1443	22.4522	(268)
Total CO2, kg/year			1274.3445	(272)
CO2 emissions per m2			18.0900	(273)
EI value			85.2103	
EI rating			85	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600	(1b)	x 2.1200	(2b) =	149.3752	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		149.3752	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8839	(18)
Number of sides sheltered		2	(19)
Shelter factor (20) = 1 - [0.075 x (19)] =		0.8500	(20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) =		0.7513	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9016	0.8828	0.8640	0.7889	0.7701	0.6950	0.6950	0.6950	0.6950	0.7889	0.8077	0.8452	(22b)
Effective ac	0.9064	0.8897	0.8733	0.8112	0.7965	0.7415	0.7415	0.7415	0.7415	0.8112	0.8262	0.8572	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			98.3000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		24.4749			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K												250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)												19.6600	(36)
Point Thermal bridges											(36a) =	0.0000	
Total fabric heat loss											(33) + (36) + (36a) =	44.1349	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.6806	43.8545	43.0459	39.9852	39.2635	36.5506	36.5506	36.5506	36.5506	39.9852	40.7243	42.2546	(38)
Heat transfer coeff	88.8154	87.9894	87.1807	84.1200	83.3983	80.6855	80.6855	80.6855	80.6855	84.1200	84.8591	86.3895	(39)
Average = Sum(39)m / 12 =												84.1345	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2605	1.2488	1.2373	1.1939	1.1836	1.1451	1.1451	1.1451	1.1451	1.1939	1.2044	1.2261	(40)
HLP (average)												1.1941	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2572	(42)
Hot water usage for mixer showers	69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464	(42c)
Average daily hot water use (litres/day)												98.6159	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)											Total = Sum(45)m =	1638.1365	
Distribution loss (46)m = 0.15 x (45)m	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	48.2668	48.0773	44.6635	45.4557	46.9275	46.9100	50.4890	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
										Total per year (kWh/year) = Sum(64)m =		2217.1455	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	69.3436	61.2544	64.9522	56.6167	54.2490	48.1942	47.2342	49.6453	50.7285	57.3261	61.3269	68.5613	(65)

5. Internal gains (see Table 5 and 5a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains (Table 5), Watts													
(66)m	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	22.0212	19.5590	15.9065	12.0422	9.0017	7.5996	8.2117	10.6738	14.3264	18.1906	21.2312	22.6332	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	296.0721	299.1444	291.4023	274.9202	254.1147	234.5603	221.4969	218.4246	226.1667	242.6487	263.4543	283.0086	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)
Water heating gains (Table 5)	93.2038	91.1524	87.3014	78.6343	72.9154	66.9364	63.4868	66.7276	70.4563	77.0512	85.1762	92.1523	(72)
Total internal gains	514.2426	512.8013	497.5556	468.5423	438.9772	405.0419	389.1408	391.7715	406.8948	440.8361	472.8071	500.7396	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	33.9635	0.7600	0.8000	0.7700	71.2655	(77)
Southwest	1.1800	33.9635	0.7600	0.8000	0.7700	16.8862	(79)

Solar gains	88.1517	153.6307	220.2507	279.4510	307.2810	311.2559	290.9564	262.3145	240.9953	177.0586	107.4518	77.8343	(83)
Total gains	602.3942	666.4320	717.8063	747.9932	746.2583	716.2978	680.0972	654.0860	647.8902	617.8946	580.2589	578.5739	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	55.0924	55.6096	56.1254	58.1675	58.6709	60.6436	60.6436	60.6436	60.6436	58.1675	57.6609	56.6395	
alpha	4.6728	4.7073	4.7417	4.8778	4.9114	5.0429	5.0429	5.0429	5.0429	4.8778	4.8441	4.7760	
util living area	0.9902	0.9834	0.9677	0.9256	0.8332	0.6678	0.5337	0.5636	0.7655	0.9361	0.9814	0.9917	(86)

MIT	19.7306	19.9018	20.1732	20.5340	20.8053	20.9544	20.9876	20.9839	20.9075	20.5653	20.1320	19.7350	(87)
Th 2	19.8719	19.8812	19.8903	19.9249	19.9331	19.9642	19.9642	19.9642	19.9642	19.9249	19.9165	19.8992	(88)
util rest of house													
	0.9870	0.9780	0.9569	0.9002	0.7772	0.5749	0.4196	0.4474	0.6828	0.9091	0.9742	0.9890	(89)
MIT 2	18.7490	18.9247	19.1968	19.5668	19.8097	19.9444	19.9608	19.9596	19.9173	19.6015	19.1808	18.7746	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	19.0303	19.2047	19.4766	19.8440	20.0950	20.2338	20.2550	20.2531	20.2010	19.8777	19.4534	19.0498	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8803	19.0547	19.3266	19.6940	19.9450	20.0838	20.1050	20.1031	20.0510	19.7277	19.3034	18.8998	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9831	0.9727	0.9499	0.8936	0.7779	0.5863	0.4356	0.4636	0.6905	0.9030	0.9688	0.9856	(94)
Useful gains	592.2248	648.2502	681.8360	668.4283	580.5447	419.9694	296.2707	303.2349	447.3589	557.9482	562.1713	570.2544	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1259.4268	1219.0634	1100.7947	891.1643	662.6004	434.3978	298.9433	306.8558	480.1624	759.4093	1001.6259	1235.3496	(97)
Space heating kWh													
	496.3982	383.5864	311.7052	160.3699	61.0494	0.0000	0.0000	0.0000	0.0000	149.8871	316.4073	494.8309	(98a)
Space heating requirement - total per year (kWh/year)												2374.2346	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	496.3982	383.5864	311.7052	160.3699	61.0494	0.0000	0.0000	0.0000	0.0000	149.8871	316.4073	494.8309	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2374.2346	
Space heating per m2											(98c) / (4) =	33.6962	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	496.3982	383.5864	311.7052	160.3699	61.0494	0.0000	0.0000	0.0000	0.0000	149.8871	316.4073	494.8309	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	590.9503	456.6505	371.0777	190.9166	72.6779	0.0000	0.0000	0.0000	0.0000	178.4370	376.6754	589.0844	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.0037	80.7279	80.1507	78.9598	77.1367	75.0000	75.0000	75.0000	75.0000	78.7785	80.3060	81.0187	(217)
Fuel for water heating, kWh/month													
	273.0693	242.3500	259.4973	230.8157	226.9787	208.0359	204.4482	214.6040	218.9418	234.7554	244.9105	270.1145	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	19.2750	15.4631	13.9228	10.2005	7.8791	6.4373	7.1876	9.3427	12.1353	15.9222	17.9840	19.8107	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2826.4697	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2828.5214	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	155.5605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5925.5517	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2826.4697	5.6000	158.2823	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2828.5214	5.6000	158.3972	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	155.5605	26.0600	40.5391	(250)
Additional standing charges			99.0000	(251)
Total energy cost			486.1876	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2826.4697	0.2100	593.5586	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2828.5214	0.2100	593.9895	(264)
Space and water heating			1187.5481	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	155.5605	0.1443	22.4522	(268)
Total CO2, kg/year			1225.9522	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2826.4697	1.1300	3193.9108	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2828.5214	1.1300	3196.2292	(278)
Space and water heating			6390.1400	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	155.5605	1.5338	238.6039	(282)
Total Primary energy kWh/year			6802.7159	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 10

Current energy efficiency rating: B 82
Current environmental impact rating: B 85

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: B 82
Potential environmental impact rating: B 85

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£71	£71	£0
Mains gas	£416	£416	£0
Space heating	£287	£287	£0
Water heating	£158	£158	£0
Lighting	£41	£41	£0
Total cost of fuels	£487	£487	£0
Total cost of uses	£486	£486	£0
Delivered energy	84 kWh/m²	84 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.2 tonnes	1.2 tonnes	0.0 tonnes
CO2 emissions per m²	17 kg/m²	17 kg/m²	0 kg/m²
Primary energy	97 kWh/m²	97 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600 (1b)	x	2.1200 (2b)	=	149.3752	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n) 70.4600						(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	149.3752	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8839 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9579	0.9391	0.9204	0.8264	0.8077	0.7137	0.7137	0.6950	0.7513	0.8077	0.8452	0.8828	(22b)
Effective ac	0.9588	0.9410	0.9235	0.8415	0.8262	0.7547	0.7547	0.7415	0.7822	0.8262	0.8572	0.8897	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			98.3000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		24.4749			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		19.6600 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	44.1349 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	47.2630	46.3848	45.5240	41.4807	40.7243	37.2027	37.2027	36.5506	38.5592	40.7243	42.2546	43.8545	(38)
Heat transfer coeff	91.3979	90.5197	89.6589	85.6156	84.8591	81.3376	81.3376	80.6855	82.6940	84.8591	86.3895	87.9894	(39)
Average = Sum(39)m / 12 =												85.6120	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2972	1.2847	1.2725	1.2151	1.2044	1.1544	1.1544	1.1451	1.1736	1.2044	1.2261	1.2488	(40)
HLP (average)												1.2150	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		2.2572 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464	(42c)
Average daily hot water use (litres/day)												98.6159	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	
Distribution loss (46)m = 0.15 x (45)m	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	48.2668	48.0773	44.6635	45.4557	46.9275	46.9100	50.4890	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)

FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
											Total per year (kWh/year) = Sum(64)m =	2217.1455	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	69.3436	61.2544	64.9522	56.6167	54.2490	48.1942	47.2342	49.6453	50.7285	57.3261	61.3269	68.5613	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.0212	19.5590	15.9065	12.0422	9.0017	7.5996	8.2117	10.6738	14.3264	18.1906	21.2312	22.6332	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	296.0721	299.1444	291.4023	274.9202	254.1147	234.5603	221.4969	218.4246	226.1667	242.6487	263.4543	283.0086	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)
Water heating gains (Table 5)													
	93.2038	91.1524	87.3014	78.6343	72.9154	66.9364	63.4868	66.7276	70.4563	77.0512	85.1762	92.1523	(72)
Total internal gains													
	514.2426	512.8013	497.5556	468.5423	438.9772	405.0419	389.1408	391.7715	406.8948	440.8361	472.8071	500.7396	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	36.7938	0.7600	0.8000	0.7700	77.2042	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	95.4976	162.6678	222.5691	275.7740	308.8898	306.6561	295.6492	270.9433	240.9953	179.7826	114.3841	81.7261	(83)
Total gains	609.7402	675.4691	720.1248	744.3162	747.8671	711.6980	684.7900	662.7148	647.8902	620.6186	587.1913	582.4657	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	53.5358	54.0552	54.5741	57.1514	57.6609	60.1574	60.1574	60.6436	59.1706	57.6609	56.6395	55.6096	
alpha	4.5691	4.6037	4.6383	4.8101	4.8441	5.0105	5.0105	5.0429	4.9447	4.8441	4.7760	4.7073	
util living area													
	0.9909	0.9842	0.9701	0.9328	0.8504	0.6831	0.5128	0.5464	0.7749	0.9382	0.9830	0.9924	(86)
MIT	19.6336	19.8231	20.1049	20.4863	20.7692	20.9477	20.9897	20.9862	20.8962	20.5476	20.0642	19.6547	(87)
Th 2	19.8431	19.8528	19.8625	19.9079	19.9165	19.9567	19.9567	19.9642	19.9412	19.9165	19.8992	19.8812	(88)
util rest of house													
	0.9879	0.9792	0.9601	0.9095	0.7986	0.5908	0.3963	0.4303	0.6917	0.9121	0.9766	0.9900	(89)
MIT 2	18.6307	18.8250	19.1084	19.5087	19.7659	19.9335	19.9542	19.9604	19.8883	19.5783	19.1005	18.6808	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	18.9181	19.1110	19.3940	19.7888	20.0534	20.2241	20.2509	20.2544	20.1771	19.8560	19.3766	18.9599	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.7681	18.9610	19.2440	19.6388	19.9034	20.0741	20.1009	20.1044	20.0271	19.7060	19.2266	18.8099	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9841	0.9739	0.9531	0.9025	0.7979	0.6019	0.4128	0.4465	0.6993	0.9058	0.9713	0.9867	(94)
Useful gains	600.0487	657.8091	686.3333	671.7421	596.7065	428.3435	282.6955	295.9061	453.0461	562.1271	570.3426	574.7115	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1322.3536	1272.7999	1142.6113	919.4114	696.1301	445.2494	284.7553	298.8895	490.1396	772.7294	1047.6112	1285.5157	(97)
Space heating kWh													
	537.3948	413.2738	339.4709	178.3219	73.9712	0.0000	0.0000	0.0000	0.0000	156.6881	343.6334	528.8383	(98a)
Space heating requirement - total per year (kWh/year)												2571.5925	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	537.3948	413.2738	339.4709	178.3219	73.9712	0.0000	0.0000	0.0000	0.0000	156.6881	343.6334	528.8383	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2571.5925	
Space heating per m2											(98c) / (4) =	36.4972	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	537.3948	413.2738	339.4709	178.3219	73.9712	0.0000	0.0000	0.0000	0.0000	156.6881	343.6334	528.8383	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													

	639.7557	491.9927	404.1320	212.2880	88.0609	0.0000	0.0000	0.0000	0.0000	186.5335	409.0874	629.5695	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.1602	80.8815	80.3374	79.1964	77.4651	75.0000	75.0000	75.0000	75.0000	78.8761	80.4844	81.1497	(217)
Fuel for water heating, kWh/month													
	272.5429	241.8898	258.8942	230.1262	226.0165	208.0359	204.4482	214.6040	218.9418	234.4649	244.3678	269.6784	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	19.2750	15.4631	13.9228	10.2005	7.8791	6.4373	7.1876	9.3427	12.1353	15.9222	17.9840	19.8107	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	3061.4196	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2824.0107	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	155.5605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	6155.9908	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	3061.4196	3.6400	111.4357	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2824.0107	3.6400	102.7940	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	155.5605	16.4900	25.6519	(250)
Additional standing charges			92.0000	(251)
Total energy cost			350.8451	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.0939	(257)
SAP value		82.2675	
SAP rating (Section 12)		82	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3061.4196	0.2100	642.8981	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2824.0107	0.2100	593.0422	(264)
Space and water heating			1235.9404	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	155.5605	0.1443	22.4522	(268)
Total CO2, kg/year			1274.3445	(272)
CO2 emissions per m2			18.0900	(273)
EI value			85.2103	
EI rating			85	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	70.4600 (1b)	x	2.1200 (2b)	=	149.3752	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.4600					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	149.3752	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1339 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.8839 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7513 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9016	0.8828	0.8640	0.7889	0.7701	0.6950	0.6950	0.6950	0.6950	0.7889	0.8077	0.8452	(22b)
Effective ac	0.9064	0.8897	0.8733	0.8112	0.7965	0.7415	0.7415	0.7415	0.7415	0.8112	0.8262	0.8572	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			6.1600	1.3258	8.1667			(27)
External Wall 1	10.8900	1.1800	9.7100	0.3000	2.9130			(29a)
Dormer Wall 1	15.3000	4.9800	10.3200	0.1800	1.8576			(29a)
External Roof 1	37.1100		37.1100	0.1600	5.9376			(30)
Dormer Roof 1	13.9200		13.9200	0.1600	2.2272			(30)
Slope Roof 1	21.0800		21.0800	0.1600	3.3728			(30)
Total net area of external elements Aum(A, m2)			98.3000					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		24.4749			(33)
Party Floor 1			70.4600					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)	19.6600	(36)
Point Thermal bridges (36a) =	0.0000	
Total fabric heat loss (33) + (36) + (36a) =	44.1349	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	44.6806	43.8545	43.0459	39.9852	39.2635	36.5506	36.5506	36.5506	36.5506	39.9852	40.7243	42.2546	(38)
Heat transfer coeff	88.8154	87.9894	87.1807	84.1200	83.3983	80.6855	80.6855	80.6855	80.6855	84.1200	84.8591	86.3895	(39)
Average = Sum(39)m / 12 =												84.1345	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2605	1.2488	1.2373	1.1939	1.1836	1.1451	1.1451	1.1451	1.1451	1.1939	1.2044	1.2261	(40)
HLP (average)												1.1941	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.2572	(42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	69.7433	68.6951	67.1679	64.2457	62.0891	59.6842	58.3173	59.8330	61.4945	64.0767	67.0616	69.4760	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	37.7464	36.3738	35.0012	33.6286	32.2560	30.8834	30.8834	32.2560	33.6286	35.0012	36.3738	37.7464	(42c)
Average daily hot water use (litres/day)												98.6159	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.4897	105.0690	102.1691	97.8743	94.3452	90.5676	89.2007	92.0890	95.1231	99.0779	103.4355	107.2224	(44)
Energy conte	170.2373	149.6168	157.0300	133.9850	127.0067	111.3635	107.8805	114.0254	117.2963	134.4478	147.3628	167.8844	(45)
Energy content (annual)										Total = Sum(45)m =		1638.1365	
Distribution loss (46)m = 0.15 x (45)m	25.5356	22.4425	23.5545	20.0977	19.0510	16.7045	16.1821	17.1038	17.5944	20.1672	22.1044	25.1827	(46)
Water storage loss:													
Total storage loss													

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	48.2668	48.0773	44.6635	45.4557	46.9275	46.9100	50.4890	49.3151	50.9589 (61)
Total heat required for water heating calculated for each month												
	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433 (64)
										Total per year (kWh/year) = Sum(64)m =		2217.1455 (64)
Electric shower(s)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
						Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =						0.0000 (64a)
Heat gains from water heating, kWh/month												
	69.3436	61.2544	64.9522	56.6167	54.2490	48.1942	47.2342	49.6453	50.7285	57.3261	61.3269	68.5613 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	135.4344	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	22.0212	19.5590	15.9065	12.0422	9.0017	7.5996	8.2117	10.6738	14.3264	18.1906	21.2312	22.6332	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	296.0721	299.1444	291.4023	274.9202	254.1147	234.5603	221.4969	218.4246	226.1667	242.6487	263.4543	283.0086	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	50.8007	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	-90.2896	(71)
Water heating gains (Table 5)													
	93.2038	91.1524	87.3014	78.6343	72.9154	66.9364	63.4868	66.7276	70.4563	77.0512	85.1762	92.1523	(72)
Total internal gains													
	514.2426	512.8013	497.5556	468.5423	438.9772	405.0419	389.1408	391.7715	406.8948	440.8361	472.8071	500.7396	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	4.9800	33.9635	0.7600	0.8000	0.7700	71.2655	(77)
Southwest	1.1800	33.9635	0.7600	0.8000	0.7700	16.8862	(79)

Solar gains	88.1517	153.6307	220.2507	279.4510	307.2810	311.2559	290.9564	262.3145	240.9953	177.0586	107.4518	77.8343	(83)
Total gains	602.3942	666.4320	717.8063	747.9932	746.2583	716.2978	680.0972	654.0860	647.8902	617.8946	580.2589	578.5739	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	55.0924	55.6096	56.1254	58.1675	58.6709	60.6436	60.6436	60.6436	60.6436	58.1675	57.6609	56.6395	
alpha	4.6728	4.7073	4.7417	4.8778	4.9114	5.0429	5.0429	5.0429	5.0429	4.8778	4.8441	4.7760	
util living area													
	0.9902	0.9834	0.9677	0.9256	0.8332	0.6678	0.5337	0.5636	0.7655	0.9361	0.9814	0.9917	(86)
MIT	19.7306	19.9018	20.1732	20.5340	20.8053	20.9544	20.9876	20.9839	20.9075	20.5653	20.1320	19.7350	(87)
Th 2	19.8719	19.8812	19.8903	19.9249	19.9331	19.9642	19.9642	19.9642	19.9642	19.9249	19.9165	19.8992	(88)
util rest of house													
	0.9870	0.9780	0.9569	0.9002	0.7772	0.5749	0.4196	0.4474	0.6828	0.9091	0.9742	0.9890	(89)
MIT 2	18.7490	18.9247	19.1968	19.5668	19.8097	19.9444	19.9608	19.9596	19.9173	19.6015	19.1808	18.7746	(90)
Living area fraction										fLA = Living area / (4) =		0.2865	(91)
MIT	19.0303	19.2047	19.4766	19.8440	20.0950	20.2338	20.2550	20.2531	20.2010	19.8777	19.4534	19.0498	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8803	19.0547	19.3266	19.6940	19.9450	20.0838	20.1050	20.1031	20.0510	19.7277	19.3034	18.8998	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9831	0.9727	0.9499	0.8936	0.7779	0.5863	0.4356	0.4636	0.6905	0.9030	0.9688	0.9856	(94)
Useful gains	592.2248	648.2502	681.8360	668.4283	580.5447	419.9694	296.2707	303.2349	447.3589	557.9482	562.1713	570.2544	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1259.4268	1219.0634	1100.7947	891.1643	662.6004	434.3978	298.9433	306.8558	480.1624	759.4093	1001.6259	1235.3496	(97)
Space heating kWh													
	496.3982	383.5864	311.7052	160.3699	61.0494	0.0000	0.0000	0.0000	0.0000	149.8871	316.4073	494.8309	(98a)
Space heating requirement - total per year (kWh/year)												2374.2346	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	496.3982	383.5864	311.7052	160.3699	61.0494	0.0000	0.0000	0.0000	0.0000	149.8871	316.4073	494.8309	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2374.2346	
Space heating per m2											(98c) / (4) =	33.6962	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)

Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	496.3982	383.5864	311.7052	160.3699	61.0494	0.0000	0.0000	0.0000	0.0000	149.8871	316.4073	494.8309	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	590.9503	456.6505	371.0777	190.9166	72.6779	0.0000	0.0000	0.0000	0.0000	178.4370	376.6754	589.0844	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	221.1962	195.6442	207.9889	182.2517	175.0840	156.0270	153.3362	160.9530	164.2064	184.9368	196.6778	218.8433	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.0037	80.7279	80.1507	78.9598	77.1367	75.0000	75.0000	75.0000	75.0000	78.7785	80.3060	81.0187	(217)
Fuel for water heating, kWh/month													
	273.0693	242.3500	259.4973	230.8157	226.9787	208.0359	204.4482	214.6040	218.9418	234.7554	244.9105	270.1145	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	19.2750	15.4631	13.9228	10.2005	7.8791	6.4373	7.1876	9.3427	12.1353	15.9222	17.9840	19.8107	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2826.4697	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												75.0000	
Water heating fuel used												2828.5214	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												115.0000	(230c)
Total electricity for the above, kWh/year												115.0000	(231)
Electricity for lighting (calculated in Appendix L)												155.5605	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5925.5517	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2826.4697	5.6000	158.2823	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2828.5214	5.6000	158.3972	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	155.5605	26.0600	40.5391	(250)
Additional standing charges			99.0000	(251)
Total energy cost			486.1876	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2826.4697	0.2100	593.5586	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2828.5214	0.2100	593.9895	(264)
Space and water heating			1187.5481	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	155.5605	0.1443	22.4522	(268)
Total CO2, kg/year			1225.9522	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2826.4697	1.1300	3193.9108	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2828.5214	1.1300	3196.2292	(278)
Space and water heating			6390.1400	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)

Energy for lighting	155.5605	1.5338	238.6039 (282)
Total Primary energy kWh/year			6802.7159 (286)

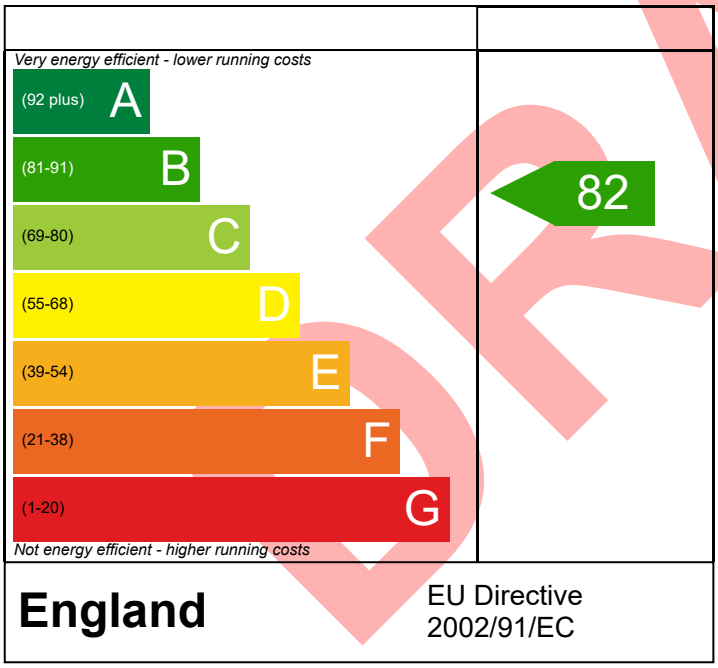
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	70.46 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

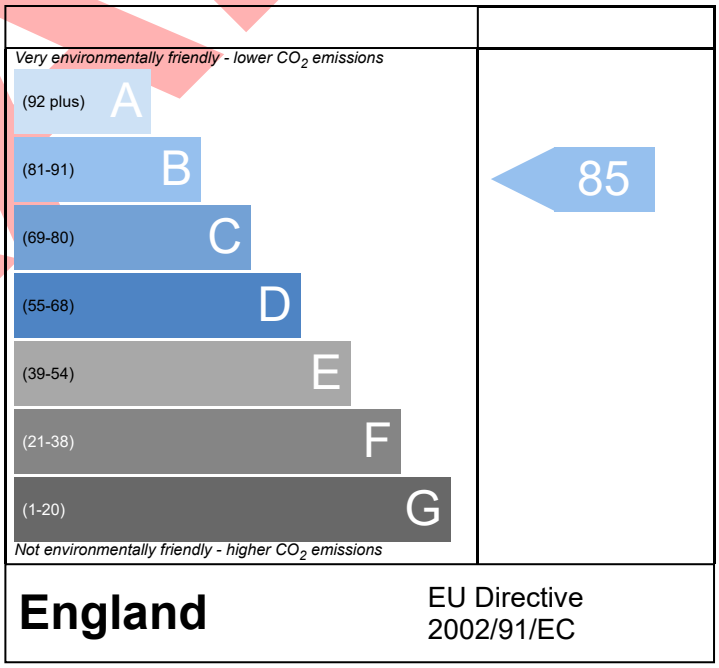
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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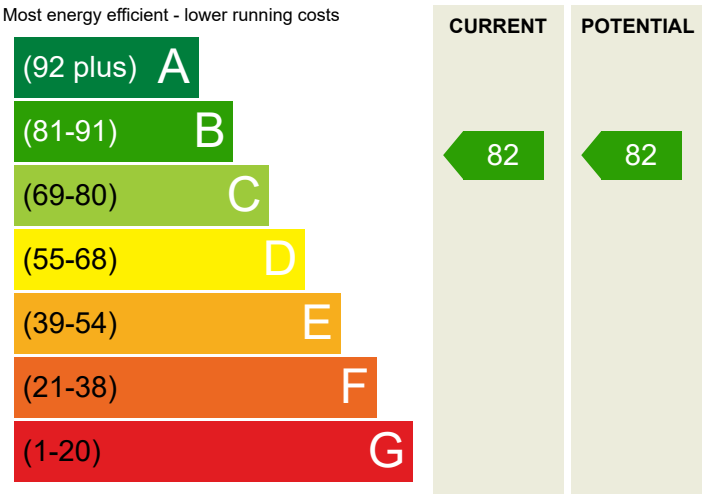
Energy Report

Dwelling Address	
Reference	Apt. 10-Apt. 10
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

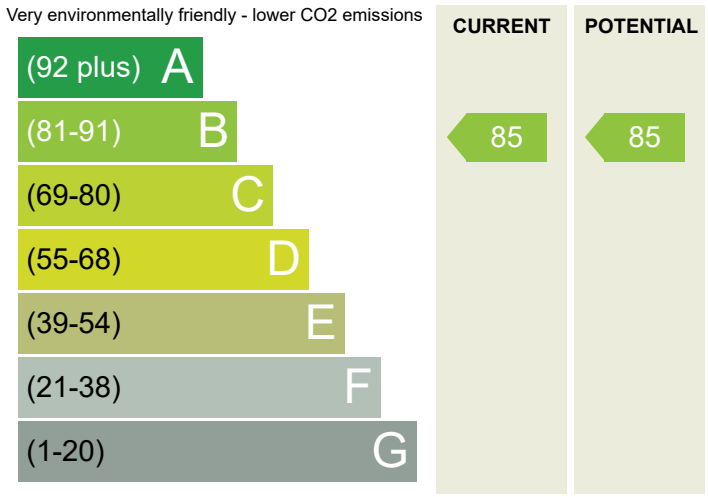
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

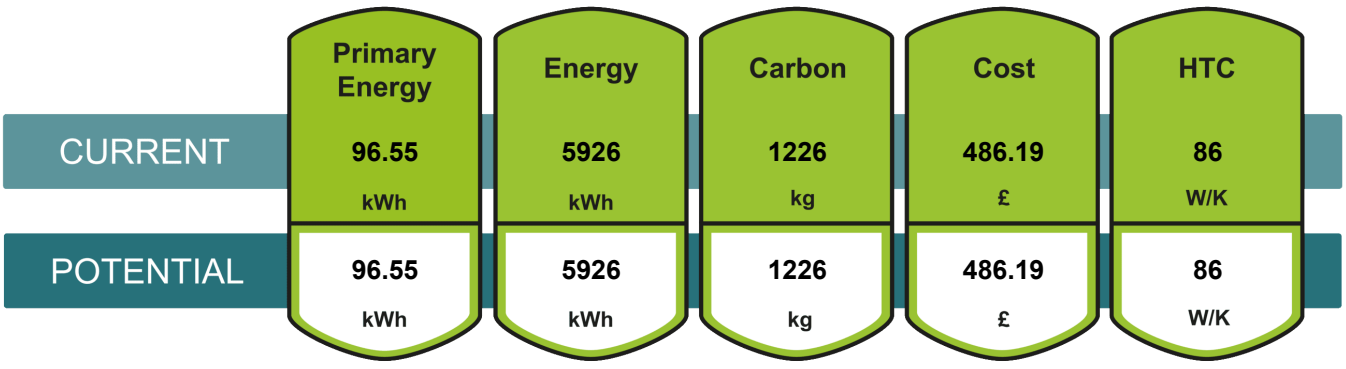
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.24 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£41	£41	You could save £0
Heating	£287	£287	
Hot Water	£158	£158	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£486	£486	

Estimated energy use and potential savings

Space Heating
2826
kWh per year

Water Heating
2829
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 10	Issued on Date	01/10/2024
Assessment Reference	Apt. 10	Prop Type Ref	Detached Flat
Property			

SAP Rating	82 B	DER	18.51	TER	
Environmental	85 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.23	DFEE	45.52	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	102.52	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northwest (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	10.89	m²	

Description	Dormer Wall 1		
Type	Timber Frame		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	15.30	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	37.11	m²	

Description	Dormer Roof 1		
Type	External Flat Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	13.92	m²	

Description	Slope Roof 1		
Type	External Slope Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	21.08	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W SE1	New Glazing	Dormer Wall 1	South East	4.98
W SW1	New Glazing	External Wall 1	South West	1.18

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System No

Comments

Lighting

No Fixed Lighting No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1

	SAP table	
Fuel Type	Mains gas	
Winter Efficiency	84.00	%
Summer Efficiency	75.00	%
Model Name		
Manufacturer		
System Type		
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Flow Temperature Value		

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2 None

Secondary Heating None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Summary for Input Data

elmhurst energy

Property Reference	Apt. 11	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 11	**Prop Type Ref**	
Property			

SAP Rating	82 B	**DER**	19.98	**TER**	
Environmental	85 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.07	**DFEE**	45.01	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	110.84	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Northeast	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Top-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	23.57 m	56.89 m²	2.15 m

8.0 Living Area	23.59	m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Solid Wall	Other	0.30	0.00	10.90	9.72	0.00	None	1.18	Enter Gross Area
Dormer Wall 1	Timber Frame	Other	0.18	0.00	10.56	7.24	0.00	None	3.32	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Plane Roof	Other	0.16	0.00	26.65	26.65	None	0.00	Enter Gross Area	0.00
Dormer Roof 1	External Flat Roof	Other	0.16	0.00	9.84	9.84	None	0.00	Enter Gross Area	0.00
Slope Roof 1	External Slope Roof	Other	0.16	0.00	22.18	22.18	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Other	0.00	56.89

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)

Summary for Input Data

New Glazing	Manufacturer	Window	Double glazed			0.76		0.80	1.40
New Door	Manufacturer	Solid Door				0.00			1.40
Existing Glazing	SAP table	Window	Double glazed	6 mm	Air Filled	0.76	Wood	0.70	3.10

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W NW1	New Glazing	Dormer Wall 1	South East	3.32	0
W SW1	New Glazing	External Wall 1	South West	1.18	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues	
Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0
21.0 Fixed Cooling System	No
22.0 Pressure Testing	No
Property Tested?	Yes
Test Method	Blower Door

22.0 Lighting

No Fixed Lighting	No

Name	Efficacy	Power	Capacity	Count
Lighting 1	185.00	10.00	1850.00	10

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	84.00	
In Summer	75.00	
Controls SAP Code	2106	
Delayed Start Stat	Yes	
Burner Control	On/Off	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	Unknown	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Boiler Interlock	Yes	

Summary for Input Data

elmhurst energy

25.0 Main Heating 2	None
26.0 Heat Networks	None

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating	None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Immersion Heater	Single
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None	
Cylinder Stat	No	
Cylinder In Heated Space	Yes	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.20	kWh/day
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating			0	0
			0	0
			0	0

Full SAP Calculation Printout

elmhurst energy

Property Reference	Apt. 11	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 11	**Prop Type Ref**	
Property			

SAP Rating	82 B	**DER**	19.98	**TER**	
Environmental	85 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.07	**DFEE**	45.01	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	110.84	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b)	x 2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	122.3135	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.9135 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9900	0.9706	0.9512	0.8541	0.8347	0.7377	0.7377	0.7183	0.7765	0.8347	0.8735	0.9124	(22b)
Effective ac	0.9901	0.9710	0.9524	0.8648	0.8484	0.7721	0.7721	0.7579	0.8015	0.8484	0.8815	0.9162	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			80.1300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		19.5723			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		16.0260 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	35.5983 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.9627	39.1946	38.4417	34.9053	34.2436	31.1635	31.1635	30.5932	32.3499	34.2436	35.5821	36.9815	(38)
Heat transfer coeff	75.5610	74.7929	74.0400	70.5036	69.8419	66.7619	66.7619	66.1915	67.9483	69.8419	71.1804	72.5798	(39)

Average = Sum(39)m / 12 =												70.5004	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3282	1.3147	1.3015	1.2393	1.2277	1.1735	1.1735	1.1635	1.1944	1.2277	1.2512	1.2758	(40)
HLP (average)												1.2392	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8925	(42)
Hot water usage for mixer showers													
	62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109	(42c)
Average daily hot water use (litres/day)												88.8608	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m													
	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3571	43.5767	46.9141	43.4922	43.3215	40.2454	40.9592	42.2855	42.2697	45.4946	45.9634	49.2344	(61)
Total heat required for water heating calculated for each month													
	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
										Total per year (kWh/year) = Sum(64)m =		2009.2061	(64)
12Total per year (kWh/year)												2009	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	63.3439	55.7207	58.7762	51.0162	48.8828	43.4269	42.5618	44.7344	45.7105	51.6554	55.6421	62.6083	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	98.1378	108.6526	98.1378	101.4091	98.1378	101.4091	98.1378	98.1378	101.4091	98.1378	101.4091	98.1378	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	165.0411	166.7537	162.4380	153.2503	141.6526	130.7523	123.4702	121.7576	126.0734	135.2610	146.8588	157.7591	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	85.1397	82.9178	79.0002	70.8558	65.7026	60.3151	57.2067	60.1269	63.4868	69.4293	77.2807	84.1509	(72)
Total internal gains													
	406.7058	416.7113	397.9633	383.9024	363.8802	343.8637	330.2020	331.4096	342.3564	361.2154	383.9357	398.4350	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	36.7938	0.7600	0.8000	0.7700	51.4695	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	69.7629	118.8320	162.5911	201.4583	225.6500	224.0183	215.9775	197.9293	176.0518	131.3347	83.5598	59.7025	(83)
Total gains	476.4687	535.5433	560.5544	585.3607	589.5303	567.8819	546.1795	529.3389	518.4082	492.5500	467.4956	458.1375	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	52.2848	52.8218	53.3589	56.0354	56.5662	59.1759	59.1759	59.6859	58.1427	56.5662	55.5025	54.4324	
alpha	4.4857	4.5215	4.5573	4.7357	4.7711	4.9451	4.9451	4.9791	4.8762	4.7711	4.7002	4.6288	
util living area													
	0.9921	0.9856	0.9746	0.9404	0.8642	0.6965	0.5260	0.5591	0.7856	0.9436	0.9842	0.9933	(86)
MIT	19.5597	19.7627	20.0331	20.4389	20.7398	20.9404	20.9878	20.9839	20.8849	20.5139	20.0207	19.5921	(87)
Th 2	19.8188	19.8293	19.8397	19.8887	19.8979	19.9412	19.9412	19.9493	19.9245	19.8979	19.8793	19.8598	(88)
util rest of house													
	0.9895	0.9809	0.9658	0.9189	0.8144	0.6030	0.4055	0.4395	0.7025	0.9190	0.9782	0.9910	(89)
MIT 2	18.5392	18.7476	19.0213	19.4496	19.7262	19.9146	19.9383	19.9450	19.8655	19.5324	19.0424	18.6025	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	18.9623	19.1685	19.4409	19.8598	20.1465	20.3400	20.3735	20.3758	20.2882	19.9394	19.4481	19.0129	(92)
Temperature adjustment												-0.1500	

adjusted MIT	18.8123	19.0185	19.2909	19.7098	19.9965	20.1900	20.2235	20.2258	20.1382	19.7894	19.2981	18.8629	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9864	0.9766	0.9605	0.9148	0.8195	0.6264	0.4385	0.4720	0.7208	0.9160	0.9741	0.9884	(94)
Useful gains	469.9949	522.9923	538.3884	535.4681	483.1270	355.7072	239.4891	249.8316	373.6719	451.1687	455.3842	452.8169	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1096.5668	1055.9659	947.0374	762.1304	579.4432	373.1973	241.9103	253.2344	410.2854	641.8047	868.2639	1064.2276	(97)
Space heating kWh	466.1695	358.1582	304.0349	163.1968	71.6592	0.0000	0.0000	0.0000	0.0000	141.8332	297.2734	454.8896	(98a)
Space heating requirement - total per year (kWh/year)												2257.2149	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	466.1695	358.1582	304.0349	163.1968	71.6592	0.0000	0.0000	0.0000	0.0000	141.8332	297.2734	454.8896	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2257.2149	
Space heating per m2											(98c) / (4) =	39.6768	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	466.1695	358.1582	304.0349	163.1968	71.6592	0.0000	0.0000	0.0000	0.0000	141.8332	297.2734	454.8896	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	554.9637	426.3788	361.9463	194.2820	85.3086	0.0000	0.0000	0.0000	0.0000	168.8490	353.8969	541.5352	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.0519	80.7772	80.3127	79.2312	77.5968	75.0000	75.0000	75.0000	75.0000	78.8862	80.3781	81.0254	(217)
Fuel for water heating, kWh/month	250.1540	220.8463	234.5966	207.2712	203.3134	187.4572	184.2243	193.3753	197.2840	211.2446	222.3852	247.4679	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	16.3697	13.1324	11.8243	8.6630	6.6915	5.4670	6.1042	7.9345	10.3061	13.5222	15.2733	16.8247	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2687.1606	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2559.6200	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	132.1128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5493.8934	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2687.1606	0.2100	564.3037	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2559.6200	0.2100	537.5202	(264)
Space and water heating			1101.8239	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)

Energy for lighting	132.1128	0.1443	19.0680	(268)
Total CO2, kg/year			1136.8438	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			19.9800	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2687.1606	1.1300	3036.4915	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2559.6200	1.1300	2892.3706	(278)
Space and water heating			5928.8620	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	132.1128	1.5338	202.6391	(282)
Total Primary energy kWh/year			6305.4731	(286)
Dwelling Primary energy Rate (DPER)			110.8400	(287)

Full SAP Calculation Printout

Property Reference	Apt. 11	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 11	**Prop Type Ref**	
Property			

SAP Rating	82 B	**DER**	19.98	**TER**	
Environmental	85 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.07	**DFEE**	45.01	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	110.84	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b)	x 2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	122.3135	(5)

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2. Ventilation rate

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	m3 per hour		
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)

	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9135	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9900	0.9706	0.9512	0.8541	0.8347	0.7377	0.7377	0.7183	0.7765	0.8347	0.8735	0.9124	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.9901	0.9710	0.9524	0.8648	0.8484	0.7721	0.7721	0.7579	0.8015	0.8484	0.8815	0.9162	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			80.1300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		19.5723			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)		16.0260	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	35.5983	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.9627	39.1946	38.4417	34.9053	34.2436	31.1635	31.1635	30.5932	32.3499	34.2436	35.5821	36.9815	(38)

Heat transfer coeff

	75.5610	74.7929	74.0400	70.5036	69.8419	66.7619	66.7619	66.1915	67.9483	69.8419	71.1804	72.5798 (39)
Average = Sum(39)m / 12 =												70.5004

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3282	1.3147	1.3015	1.2393	1.2277	1.1735	1.1735	1.1635	1.1944	1.2277	1.2512	1.2758	(40)
HLP (average)												1.2392	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8925 (42)

Hot water usage for mixer showers

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)

Hot water usage for baths

	24.1837	23.8245	23.3187	22.3862	21.6879	20.9136	20.4954	20.9976	21.5444	22.3730	23.3247	24.1019 (42b)

Hot water usage for other uses

	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109 (42c)
Average daily hot water use (litres/day)												53.3411 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	58.1946	56.5986	54.8561	52.6868	50.7517	48.7407	48.3225	50.0615	51.8451	53.9103	56.0989	58.1128	(44)
Energy conte	92.1660	80.5957	84.3118	72.1256	68.3216	59.9324	58.4418	61.9865	63.9301	73.1558	79.9231	90.9906	(45)
Energy content (annual)										Total = Sum(45)m =		885.8811	
Distribution loss (46)m = 0.15 x (45)m													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
	78.3411	68.5064	71.6650	61.3068	58.0734	50.9425	49.6756	52.6886	54.3406	62.1825	67.9346	77.3420	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	78.3411	68.5064	71.6650	61.3068	58.0734	50.9425	49.6756	52.6886	54.3406	62.1825	67.9346	77.3420	(64)
										Total per year (kWh/year) = Sum(64)m =		752.9990	(64)
12Total per year (kWh/year)												753	(64)
Electric shower(s)													
	44.8068	39.9232	43.5947	41.6018	42.3825	40.4288	41.7764	42.3825	41.6018	43.5947	42.7749	44.8068	(64a)
							Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					509.6749	(64a)
Heat gains from water heating, kWh/month													
	30.7870	27.1074	28.8149	25.7271	25.1140	22.8428	22.8630	23.7678	23.9856	26.4443	27.6774	30.5372	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	98.1378	108.6526	98.1378	101.4091	98.1378	101.4091	98.1378	98.1378	101.4091	98.1378	101.4091	98.1378	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	165.0411	166.7537	162.4380	153.2503	141.6526	130.7523	123.4702	121.7576	126.0734	135.2610	146.8588	157.7591	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	41.3803	40.3384	38.7297	35.7322	33.7553	31.7261	30.7298	31.9459	33.3134	35.5434	38.4408	41.0446	(72)
Total internal gains													
	355.9465	367.1319	350.6928	341.7788	324.9329	315.2747	303.7251	303.2286	312.1830	320.3294	338.0959	348.3287	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	36.7938	0.7600	0.8000	0.7700	51.4695	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	69.7629	118.8320	162.5911	201.4583	225.6500	224.0183	215.9775	197.9293	176.0518	131.3347	83.5598	59.7025	(83)
Total gains	425.7094	485.9639	513.2839	543.2370	550.5830	539.2930	519.7026	501.1579	488.2348	451.6641	421.6557	408.0312	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	52.2848	52.8218	53.3589	56.0354	56.5662	59.1759	59.1759	59.6859	58.1427	56.5662	55.5025	54.4324	
alpha	4.4857	4.5215	4.5573	4.7357	4.7711	4.9451	4.9451	4.9791	4.8762	4.7711	4.7002	4.6288	
util living area													
	0.9949	0.9901	0.9816	0.9537	0.8874	0.7229	0.5501	0.5865	0.8126	0.9581	0.9895	0.9958	(86)
MIT	19.4700	19.6773	19.9553	20.3788	20.7009	20.9297	20.9852	20.9802	20.8652	20.4545	19.9414	19.5023	(87)
Th 2	19.8188	19.8293	19.8397	19.8887	19.8979	19.9412	19.9412	19.9493	19.9245	19.8979	19.8793	19.8598	(88)
util rest of house													
	0.9932	0.9867	0.9750	0.9360	0.8425	0.6295	0.4255	0.4630	0.7328	0.9386	0.9854	0.9944	(89)
MIT 2	18.4504	18.6638	18.9463	19.3950	19.6960	19.9092	19.9376	19.9439	19.8535	19.4790	18.9650	18.5136	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)

MIT	18.8732	19.0841	19.3647	19.8030	20.1127	20.3324	20.3720	20.3736	20.2730	19.8835	19.3699	18.9236	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.8732	19.0841	19.3647	19.8030	20.1127	20.3324	20.3720	20.3736	20.2730	19.8835	19.3699	18.9236	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9913	0.9839	0.9715	0.9344	0.8525	0.6662	0.4775	0.5145	0.7613	0.9383	0.9829	0.9928	(94)
Useful gains	422.0126	478.1408	498.6713	507.5854	469.3450	359.2765	248.1679	257.8648	371.7055	423.7861	414.4259	405.0918	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1101.1648	1060.8681	952.5005	768.6973	587.5584	382.7039	251.8254	263.0177	419.4455	648.3777	873.3735	1068.6338	(97)
Space heating kWh													
	505.2893	391.5927	337.6489	188.0006	87.9508	0.0000	0.0000	0.0000	0.0000	167.0962	330.4423	493.6752	(98a)
Space heating requirement - total per year (kWh/year)												2501.6960	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	505.2893	391.5927	337.6489	188.0006	87.9508	0.0000	0.0000	0.0000	0.0000	167.0962	330.4423	493.6752	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2501.6960	
Space heating per m2											(98c) / (4) =	43.9743	(99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W													
	0.0000	0.0000	0.0000	0.0000	0.0000	627.5614	494.0377	503.0551	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8001	0.8811	0.8630	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	502.0894	435.2742	434.1389	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	583.4020	562.8302	543.1769	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	58.5451	94.9017	81.1243	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction										fC = cooled area / (4) =		1.0000	(105)
Intermittency factor (Table 10b)													
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	(106)
Space cooling kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	14.6363	23.7254	20.2811	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												58.6428	(107)
Energy for space heating												43.9743	(99)
Energy for space cooling												1.0308	(108)
Total												45.0051	(109)
Fabric Energy Efficiency (DFEE)												45.0	(109)

Full SAP Calculation Printout

elmhurst energy

Property Reference	Apt. 11	**Issued on Date**	01/10/2024
Assessment Reference	Apt. 11	**Prop Type Ref**	
Property			

SAP Rating	82 B	**DER**	19.98	**TER**	
Environmental	85 B	**% DER < TER**			N/A
CO_2 Emissions (t/year)	1.07	**DFEE**	45.01	**TFEE**	
Compliance Check	See BREL	**% DFEE < TFEE**			
% DPER < TPER		**DPER**	110.84	**TPER**	

Assessor Details	Mr. Aharon Horwich	**Assessor ID**	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b)	x 2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	122.3135	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.9135 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9900	0.9706	0.9512	0.8541	0.8347	0.7377	0.7377	0.7183	0.7765	0.8347	0.8735	0.9124	(22b)
Effective ac	0.9901	0.9710	0.9524	0.8648	0.8484	0.7721	0.7721	0.7579	0.8015	0.8484	0.8815	0.9162	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			80.1300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		19.5723			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		16.0260 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	35.5983 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.9627	39.1946	38.4417	34.9053	34.2436	31.1635	31.1635	30.5932	32.3499	34.2436	35.5821	36.9815	(38)
Heat transfer coeff	75.5610	74.7929	74.0400	70.5036	69.8419	66.7619	66.7619	66.1915	67.9483	69.8419	71.1804	72.5798	(39)

Average = Sum(39)m / 12 =												70.5004	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3282	1.3147	1.3015	1.2393	1.2277	1.1735	1.1735	1.1635	1.1944	1.2277	1.2512	1.2758	(40)
HLP (average)												1.2392	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8925	(42)
Hot water usage for mixer showers													
	62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051	(42a)
Hot water usage for baths													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses													
	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109	(42c)
Average daily hot water use (litres/day)												88.8608	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m													
	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3571	43.5767	46.9141	43.4922	43.3215	40.2454	40.9592	42.2855	42.2697	45.4946	45.9634	49.2344	(61)
Total heat required for water heating calculated for each month													
	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
										Total per year (kWh/year) = Sum(64)m =		2009.2061	(64)
12Total per year (kWh/year)												2009	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month													
	63.3439	55.7207	58.7762	51.0162	48.8828	43.4269	42.5618	44.7344	45.7105	51.6554	55.6421	62.6083	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	94.6241	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	98.1378	108.6526	98.1378	101.4091	98.1378	101.4091	98.1378	98.1378	101.4091	98.1378	101.4091	98.1378	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	165.0411	166.7537	162.4380	153.2503	141.6526	130.7523	123.4702	121.7576	126.0734	135.2610	146.8588	157.7591	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	32.4624	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	85.1397	82.9178	79.0002	70.8558	65.7026	60.3151	57.2067	60.1269	63.4868	69.4293	77.2807	84.1509	(72)
Total internal gains													
	406.7058	416.7113	397.9633	383.9024	363.8802	343.8637	330.2020	331.4096	342.3564	361.2154	383.9357	398.4350	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	36.7938	0.7600	0.8000	0.7700	51.4695	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	69.7629	118.8320	162.5911	201.4583	225.6500	224.0183	215.9775	197.9293	176.0518	131.3347	83.5598	59.7025	(83)
Total gains	476.4687	535.5433	560.5544	585.3607	589.5303	567.8819	546.1795	529.3389	518.4082	492.5500	467.4956	458.1375	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	52.2848	52.8218	53.3589	56.0354	56.5662	59.1759	59.1759	59.6859	58.1427	56.5662	55.5025	54.4324	
alpha	4.4857	4.5215	4.5573	4.7357	4.7711	4.9451	4.9451	4.9791	4.8762	4.7711	4.7002	4.6288	
util living area													
	0.9921	0.9856	0.9746	0.9404	0.8642	0.6965	0.5260	0.5591	0.7856	0.9436	0.9842	0.9933	(86)
MIT	19.5597	19.7627	20.0331	20.4389	20.7398	20.9404	20.9878	20.9839	20.8849	20.5139	20.0207	19.5921	(87)
Th 2	19.8188	19.8293	19.8397	19.8887	19.8979	19.9412	19.9412	19.9493	19.9245	19.8979	19.8793	19.8598	(88)
util rest of house													
	0.9895	0.9809	0.9658	0.9189	0.8144	0.6030	0.4055	0.4395	0.7025	0.9190	0.9782	0.9910	(89)
MIT 2	18.5392	18.7476	19.0213	19.4496	19.7262	19.9146	19.9383	19.9450	19.8655	19.5324	19.0424	18.6025	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	18.9623	19.1685	19.4409	19.8598	20.1465	20.3400	20.3735	20.3758	20.2882	19.9394	19.4481	19.0129	(92)
Temperature adjustment												-0.1500	

adjusted MIT	18.8123	19.0185	19.2909	19.7098	19.9965	20.1900	20.2235	20.2258	20.1382	19.7894	19.2981	18.8629	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9864	0.9766	0.9605	0.9148	0.8195	0.6264	0.4385	0.4720	0.7208	0.9160	0.9741	0.9884	(94)
Useful gains	469.9949	522.9923	538.3884	535.4681	483.1270	355.7072	239.4891	249.8316	373.6719	451.1687	455.3842	452.8169	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1096.5668	1055.9659	947.0374	762.1304	579.4432	373.1973	241.9103	253.2344	410.2854	641.8047	868.2639	1064.2276	(97)
Space heating kWh	466.1695	358.1582	304.0349	163.1968	71.6592	0.0000	0.0000	0.0000	0.0000	141.8332	297.2734	454.8896	(98a)
Space heating requirement - total per year (kWh/year)												2257.2149	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	466.1695	358.1582	304.0349	163.1968	71.6592	0.0000	0.0000	0.0000	0.0000	141.8332	297.2734	454.8896	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2257.2149	
Space heating per m2											(98c) / (4) =	39.6768	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	466.1695	358.1582	304.0349	163.1968	71.6592	0.0000	0.0000	0.0000	0.0000	141.8332	297.2734	454.8896	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	554.9637	426.3788	361.9463	194.2820	85.3086	0.0000	0.0000	0.0000	0.0000	168.8490	353.8969	541.5352	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
Efficiency of water heater												75.0000	(216)
(217)m	81.0519	80.7772	80.3127	79.2312	77.5968	75.0000	75.0000	75.0000	75.0000	78.8862	80.3781	81.0254	(217)
Fuel for water heating, kWh/month	250.1540	220.8463	234.5966	207.2712	203.3134	187.4572	184.2243	193.3753	197.2840	211.2446	222.3852	247.4679	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	16.3697	13.1324	11.8243	8.6630	6.6915	5.4670	6.1042	7.9345	10.3061	13.5222	15.2733	16.8247	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2687.1606	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2559.6200	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	132.1128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5493.8934	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2687.1606	0.2100	564.3037	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2559.6200	0.2100	537.5202	(264)
Space and water heating			1101.8239	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)

Energy for lighting	132.1128	0.1443	19.0680	(268)
Total CO2, kg/year			1136.8438	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			19.9800	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2687.1606	1.1300	3036.4915	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2559.6200	1.1300	2892.3706	(278)
Space and water heating			5928.8620	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	132.1128	1.5338	202.6391	(282)
Total Primary energy kWh/year			6305.4731	(286)
Dwelling Primary energy Rate (DPER)			110.8400	(287)

Full SAP Calculation Printout

Property Reference	Apt. 11	Issued on Date	01/10/2024
Assessment Reference	Apt. 11	Prop Type Ref	
Property			

SAP Rating	82 B	DER	19.98	TER	
Environmental	85 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.07	DFEE	45.01	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	110.84	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b)	x 2.1500	(2b) =	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		122.3135	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.9135 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9900	0.9706	0.9512	0.8541	0.8347	0.7377	0.7377	0.7183	0.7765	0.8347	0.8735	0.9124	(22b)
Effective ac	0.9901	0.9710	0.9524	0.8648	0.8484	0.7721	0.7721	0.7579	0.8015	0.8484	0.8815	0.9162	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			80.1300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		19.5723			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		16.0260 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	35.5983 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.9627	39.1946	38.4417	34.9053	34.2436	31.1635	31.1635	30.5932	32.3499	34.2436	35.5821	36.9815	(38)
Heat transfer coeff	75.5610	74.7929	74.0400	70.5036	69.8419	66.7619	66.7619	66.1915	67.9483	69.8419	71.1804	72.5798	(39)

Average = Sum(39)m / 12 = 70.5004

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3282	1.3147	1.3015	1.2393	1.2277	1.1735	1.1735	1.1635	1.1944	1.2277	1.2512	1.2758	(40)
HLP (average)												1.2392	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8925 (42)

Hot water usage for mixer showers

62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109	(42c)

Average daily hot water use (litres/day) 88.8608 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3571	43.5767	46.9141	43.4922	43.3215	40.2454	40.9592	42.2855	42.2697	45.4946	45.9634	49.2344	(61)
Total heat required for water heating calculated for each month	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
								Total per year (kWh/year) = Sum(64)m =				2009.2061	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				0.0000	(64a)
Heat gains from water heating, kWh/month	63.3439	55.7207	58.7762	51.0162	48.8828	43.4269	42.5618	44.7344	45.7105	51.6554	55.6421	62.6083	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	18.7019	16.6109	13.5089	10.2271	7.6449	6.4541	6.9739	9.0650	12.1670	15.4488	18.0310	19.2217	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	246.3300	248.8862	242.4448	228.7319	211.4217	195.1527	184.2839	181.7278	188.1692	201.8821	219.1922	235.4613	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)	85.1397	82.9178	79.0002	70.8558	65.7026	60.3151	57.2067	60.1269	63.4868	69.4293	77.2807	84.1509	(72)
Total internal gains	443.2687	441.5118	428.0509	402.9118	377.8663	348.0189	334.5616	337.0167	349.9199	379.8572	407.6009	431.9310	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	36.7938	0.7600	0.8000	0.7700	51.4695	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	69.7629	118.8320	162.5911	201.4583	225.6500	224.0183	215.9775	197.9293	176.0518	131.3347	83.5598	59.7025	(83)
Total gains	513.0315	560.3438	590.6420	604.3700	603.5163	572.0372	550.5391	534.9460	525.9717	511.1918	491.1607	491.6334	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, ni1,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	52.2848	52.8218	53.3589	56.0354	56.5662	59.1759	59.1759	59.6859	58.1427	56.5662	55.5025	54.4324	
alpha	4.4857	4.5215	4.5573	4.7357	4.7711	4.9451	4.9451	4.9791	4.8762	4.7711	4.7002	4.6288	
util living area	0.9895	0.9829	0.9694	0.9338	0.8556	0.6927	0.5222	0.5538	0.7789	0.9362	0.9809	0.9910	(86)
MIT	19.6235	19.8047	20.0812	20.4647	20.7526	20.9418	20.9882	20.9846	20.8894	20.5396	20.0608	19.6514	(87)
Th 2	19.8188	19.8293	19.8397	19.8887	19.8979	19.9412	19.9412	19.9493	19.9245	19.8979	19.8793	19.8598	(88)
util rest of house	0.9861	0.9774	0.9590	0.9107	0.8043	0.5992	0.4024	0.4350	0.6951	0.9092	0.9738	0.9882	(89)
MIT 2	18.6020	18.7886	19.0673	19.4727	19.7360	19.9153	19.9384	19.9452	19.8682	19.5550	19.0812	18.6611	(90)
Living area fraction									fLA = Living area / (4) =			0.4147	(91)
MIT	19.0255	19.2099	19.4877	19.8840	20.1575	20.3410	20.3737	20.3762	20.2916	19.9633	19.4874	19.0717	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8755	19.0599	19.3377	19.7340	20.0075	20.1910	20.2237	20.2262	20.1416	19.8133	19.3374	18.9217	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9824	0.9727	0.9534	0.9068	0.8101	0.6227	0.4352	0.4673	0.7138	0.9067	0.9693	0.9850	(94)
Useful gains	503.9907	545.0515	563.1088	548.0406	488.8804	356.2088	239.5822	250.0002	375.4247	463.5049	476.0871	484.2383	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1101.3427	1059.0613	950.5061	763.8385	580.2139	373.2634	241.9246	253.2593	410.5170	643.4712	871.0646	1068.4988	(97)
Space heating kWh													
	444.4298	345.4146	288.2235	155.3744	67.9521	0.0000	0.0000	0.0000	0.0000	133.8949	284.3838	434.6898	(98a)
Space heating requirement - total per year (kWh/year)												2154.3631	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	444.4298	345.4146	288.2235	155.3744	67.9521	0.0000	0.0000	0.0000	0.0000	133.8949	284.3838	434.6898	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2154.3631	
Space heating per m2											(98c) / (4) =	37.8689	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	444.4298	345.4146	288.2235	155.3744	67.9521	0.0000	0.0000	0.0000	0.0000	133.8949	284.3838	434.6898	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	529.0831	411.2078	343.1233	184.9696	80.8954	0.0000	0.0000	0.0000	0.0000	159.3987	338.5522	517.4878	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
Efficiency of water heater												75.0000	(216)
(217)m	80.9565	80.7018	80.1959	79.1213	77.4998	75.0000	75.0000	75.0000	75.0000	78.7595	80.2818	80.9342	(217)
Fuel for water heating, kWh/month													
	250.4489	221.0525	234.9382	207.5592	203.5680	187.4572	184.2243	193.3753	197.2840	211.5843	222.6521	247.7465	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	16.3697	13.1324	11.8243	8.6630	6.6915	5.4670	6.1042	7.9345	10.3061	13.5222	15.2733	16.8247	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2564.7179	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2561.8904	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	132.1128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5373.7212	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2564.7179	3.6400	93.3557	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2561.8904	3.6400	93.2528	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	132.1128	16.4900	21.7854	(250)

Additional standing charges		92.0000 (251)
Total energy cost		319.3574 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.1284	(257)
SAP value		81.7093	
SAP rating (Section 12)		82	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2564.7179	0.2100	538.5908	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2561.8904	0.2100	537.9970	(264)
Space and water heating			1076.5878	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	132.1128	0.1443	19.0680	(268)
Total CO2, kg/year			1111.6076	(272)
CO2 emissions per m2			19.5400	(273)
EI value			85.3808	
EI rating			85	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY

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1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900	(1b)	x 2.1500	(2b)	= 122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)		= 122.3135	(5)

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2. Ventilation rate

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		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
	Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.9135	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9318	0.9124	0.8930	0.8153	0.7959	0.7183	0.7183	0.7183	0.7183	0.8153	0.8347	0.8735	(22b)
Effective ac	0.9341	0.9162	0.8987	0.8324	0.8167	0.7579	0.7579	0.7579	0.7579	0.8324	0.8484	0.8815	(25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			80.1300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		19.5723			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K												250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)												16.0260	(36)
Point Thermal bridges											(36a) =	0.0000	
Total fabric heat loss											(33) + (36) + (36a) =	35.5983	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	37.7040	36.9815	36.2742	33.5972	32.9660	30.5932	30.5932	30.5932	30.5932	33.5972	34.2436	35.5821	(38)
Heat transfer coeff	73.3023	72.5798	71.8725	69.1955	68.5643	66.1915	66.1915	66.1915	66.1915	69.1955	69.8419	71.1804	(39)
Average = Sum(39)m / 12 =												69.2082	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2885	1.2758	1.2634	1.2163	1.2052	1.1635	1.1635	1.1635	1.1635	1.2163	1.2277	1.2512	(40)
HLP (average)												1.2165	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8925	(42)
Hot water usage for mixer showers	62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109	(42c)
Average daily hot water use (litres/day)												88.8608	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)											Total = Sum(45)m =	1476.0922	
Distribution loss (46)m = 0.15 x (45)m	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3571	43.5767	46.9141	43.4922	43.3215	40.2454	40.9592	42.2855	42.2697	45.4946	45.9634	49.2344	(61)
Total heat required for water heating calculated for each month	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
										Total per year (kWh/year) = Sum(64)m =		2009.2061	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	63.3439	55.7207	58.7762	51.0162	48.8828	43.4269	42.5618	44.7344	45.7105	51.6554	55.6421	62.6083	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	18.7019	16.6109	13.5089	10.2271	7.6449	6.4541	6.9739	9.0650	12.1670	15.4488	18.0310	19.2217	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	246.3300	248.8862	242.4448	228.7319	211.4217	195.1527	184.2839	181.7278	188.1692	201.8821	219.1922	235.4613	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)	85.1397	82.9178	79.0002	70.8558	65.7026	60.3151	57.2067	60.1269	63.4868	69.4293	77.2807	84.1509	(72)
Total internal gains	443.2687	441.5118	428.0509	402.9118	377.8663	348.0189	334.5616	337.0167	349.9199	379.8572	407.6009	431.9310	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	33.9635	0.7600	0.8000	0.7700	47.5103	(77)
Southwest	1.1800	33.9635	0.7600	0.8000	0.7700	16.8862	(79)

Solar gains	64.3965	112.2302	160.8974	204.1444	224.4748	227.3785	212.5493	191.6259	176.0518	129.3447	78.4956	56.8595	(83)
Total gains	507.6652	553.7420	588.9483	607.0561	602.3410	575.3975	547.1109	528.6425	525.9717	509.2019	486.0965	488.7905	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	53.8959	54.4324	54.9681	57.0947	57.6203	59.6859	59.6859	59.6859	59.6859	57.0947	56.5662	55.5025	
alpha	4.5931	4.6288	4.6645	4.8063	4.8414	4.9791	4.9791	4.9791	4.9791	4.8063	4.7711	4.7002	
util living area	0.9886	0.9819	0.9668	0.9268	0.8387	0.6777	0.5428	0.5704	0.7690	0.9339	0.9790	0.9902	(86)

MIT	19.7264	19.8892	20.1537	20.5145	20.7912	20.9492	20.9859	20.9821	20.9018	20.5584	20.1324	19.7357	(87)
Th 2	19.8499	19.8598	19.8696	19.9070	19.9158	19.9493	19.9493	19.9493	19.9493	19.9070	19.8979	19.8793	(88)
util rest of house	0.9849	0.9761	0.9557	0.9016	0.7830	0.5834	0.4257	0.4519	0.6858	0.9060	0.9711	0.9870	(89)
MIT 2	18.7278	18.8955	19.1613	19.5337	19.7831	19.9272	19.9455	19.9443	19.8996	19.5798	19.1661	18.7597	(90)
Living area fraction									fLA = Living area / (4) =			0.4147	(91)
MIT	19.1419	19.3075	19.5728	19.9404	20.2011	20.3510	20.3769	20.3746	20.3152	19.9856	19.5668	19.1644	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.9919	19.1575	19.4228	19.7904	20.0511	20.2010	20.2269	20.2246	20.1652	19.8356	19.4168	19.0144	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9812	0.9714	0.9502	0.8984	0.7908	0.6074	0.4576	0.4840	0.7045	0.9038	0.9665	0.9837	(94)
Useful gains	498.1100	537.8822	559.5920	545.3735	476.3065	349.4702	250.3386	255.8772	370.5560	460.2296	469.8255	480.8307	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W	1047.6272	1013.0335	914.4204	739.7272	552.0211	364.1182	253.3094	259.7755	401.4622	632.1424	832.2910	1026.0213	(97)
Space heating kWh	408.8408	319.3017	263.9923	139.9347	56.3316	0.0000	0.0000	0.0000	0.0000	127.9032	260.9752	405.6219	(98a)
Space heating requirement - total per year (kWh/year)												1982.9013	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	408.8408	319.3017	263.9923	139.9347	56.3316	0.0000	0.0000	0.0000	0.0000	127.9032	260.9752	405.6219	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1982.9013	
Space heating per m2											(98c) / (4) =	34.8550	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	408.8408	319.3017	263.9923	139.9347	56.3316	0.0000	0.0000	0.0000	0.0000	127.9032	260.9752	405.6219	(98)
Space heating efficiency (main heating system 1)	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)	486.7152	380.1210	314.2766	166.5889	67.0615	0.0000	0.0000	0.0000	0.0000	152.2657	310.6848	482.8832	(211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
Efficiency of water heater												75.0000	(216)
(217)m	80.7862	80.5359	80.0018	78.8887	77.1756	75.0000	75.0000	75.0000	75.0000	78.6597	80.0930	80.7928	(217)
Fuel for water heating, kWh/month	250.9769	221.5079	235.5081	208.1711	204.4230	187.4572	184.2243	193.3753	197.2840	211.8528	223.1768	248.1802	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	16.3697	13.1324	11.8243	8.6630	6.6915	5.4670	6.1042	7.9345	10.3061	13.5222	15.2733	16.8247	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2360.5968	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												75.0000	
Water heating fuel used												2566.1375	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												115.0000	(230c)
Total electricity for the above, kWh/year												115.0000	(231)
Electricity for lighting (calculated in Appendix L)												132.1128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5173.8471	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2360.5968	5.6000	132.1934	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2566.1375	5.6000	143.7037	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	132.1128	26.0600	34.4286	(250)
Additional standing charges			99.0000	(251)
Total energy cost			439.2947	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2360.5968	0.2100	495.7253	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2566.1375	0.2100	538.8889	(264)
Space and water heating			1034.6142	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	132.1128	0.1443	19.0680	(268)
Total CO2, kg/year			1069.6341	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2360.5968	1.1300	2667.4744	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2566.1375	1.1300	2899.7354	(278)
Space and water heating			5567.2098	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)
Energy for lighting	132.1128	1.5338	202.6391	(282)
Total Primary energy kWh/year			5943.8208	(286)

SAP 10 EPC IMPROVEMENTS

Apt. 11

Current energy efficiency rating: B 82
Current environmental impact rating: B 85

N Solar water heating	Not applicable
U Solar photovoltaic panels	Not applicable
V2 Wind turbine	Not applicable

Recommended measures:	SAP change	Cost change	CO2 change
(none)			

	Typical annual savings	Energy efficiency	Environmental impact
Recommended measures			
(none)			
Total Savings	£0	0.00 kg/m²	

Potential energy efficiency rating: B 82
Potential environmental impact rating: B 85

Fuel prices for cost data on this page from database revision number 551 TEST (31 Jul 2024)
Recommendation texts revision number 6.1 (11 Jun 2019)

Typical heating and lighting costs of this home (per year, West Pennines (England)):

	Current	Potential	Saving
Electricity	£64	£64	£0
Mains gas	£375	£375	£0
Space heating	£261	£261	£0
Water heating	£144	£144	£0
Lighting	£34	£34	£0
Total cost of fuels	£439	£439	£0
Total cost of uses	£439	£439	£0
Delivered energy	91 kWh/m²	91 kWh/m²	0 kWh/m²
Carbon dioxide emissions	1.1 tonnes	1.1 tonnes	0.0 tonnes
CO2 emissions per m²	19 kg/m²	19 kg/m²	0 kg/m²
Primary energy	104 kWh/m²	104 kWh/m²	0 kWh/m²

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF ENERGY RATING FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900 (1b)	x	2.1500 (2b)	=	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n) 56.8900						(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	122.3135	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.9135 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.9900	0.9706	0.9512	0.8541	0.8347	0.7377	0.7377	0.7183	0.7765	0.8347	0.8735	0.9124	(22b)
Effective ac	0.9901	0.9710	0.9524	0.8648	0.8484	0.7721	0.7721	0.7579	0.8015	0.8484	0.8815	0.9162	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			80.1300					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		19.5723			(33)
Party Floor 1			56.8900					(32d)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)		16.0260 (36)
Point Thermal bridges	(36a) =	0.0000
Total fabric heat loss	(33) + (36) + (36a) =	35.5983 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.9627	39.1946	38.4417	34.9053	34.2436	31.1635	31.1635	30.5932	32.3499	34.2436	35.5821	36.9815	(38)
Heat transfer coeff	75.5610	74.7929	74.0400	70.5036	69.8419	66.7619	66.7619	66.1915	67.9483	69.8419	71.1804	72.5798	(39)
Average = Sum(39)m / 12 =												70.5004	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3282	1.3147	1.3015	1.2393	1.2277	1.1735	1.1735	1.1635	1.1944	1.2277	1.2512	1.2758	(40)
HLP (average)												1.2392	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy		1.8925 (42)

Hot water usage for mixer showers

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051	(42a)

Hot water usage for baths

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)

Hot water usage for other uses

34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109	(42c)

Average daily hot water use (litres/day)		88.8608 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)

Water storage loss:

Total storage loss

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)

If cylinder contains dedicated solar storage

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss 49.3571	43.5767	46.9141	43.4922	43.3215	40.2454	40.9592	42.2855	42.2697	45.4946	45.9634	49.2344	(61)

Total heat required for water heating calculated for each month

202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(62)
WWHRS 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)

FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
											Total per year (kWh/year) = Sum(64)m =	2009.2061	(64)
Electric shower(s)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =	0.0000	(64a)
Heat gains from water heating, kWh/month													
	63.3439	55.7207	58.7762	51.0162	48.8828	43.4269	42.5618	44.7344	45.7105	51.6554	55.6421	62.6083	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.7019	16.6109	13.5089	10.2271	7.6449	6.4541	6.9739	9.0650	12.1670	15.4488	18.0310	19.2217	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	246.3300	248.8862	242.4448	228.7319	211.4217	195.1527	184.2839	181.7278	188.1692	201.8821	219.1922	235.4613	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	85.1397	82.9178	79.0002	70.8558	65.7026	60.3151	57.2067	60.1269	63.4868	69.4293	77.2807	84.1509	(72)
Total internal gains													
	443.2687	441.5118	428.0509	402.9118	377.8663	348.0189	334.5616	337.0167	349.9199	379.8572	407.6009	431.9310	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	36.7938	0.7600	0.8000	0.7700	51.4695	(77)
Southwest	1.1800	36.7938	0.7600	0.8000	0.7700	18.2934	(79)

Solar gains	69.7629	118.8320	162.5911	201.4583	225.6500	224.0183	215.9775	197.9293	176.0518	131.3347	83.5598	59.7025	(83)
Total gains	513.0315	560.3438	590.6420	604.3700	603.5163	572.0372	550.5391	534.9460	525.9717	511.1918	491.1607	491.6334	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	52.2848	52.8218	53.3589	56.0354	56.5662	59.1759	59.1759	59.6859	58.1427	56.5662	55.5025	54.4324	
alpha	4.4857	4.5215	4.5573	4.7357	4.7711	4.9451	4.9451	4.9791	4.8762	4.7711	4.7002	4.6288	
util living area													
	0.9895	0.9829	0.9694	0.9338	0.8556	0.6927	0.5222	0.5538	0.7789	0.9362	0.9809	0.9910	(86)
MIT	19.6235	19.8047	20.0812	20.4647	20.7526	20.9418	20.9882	20.9846	20.8894	20.5396	20.0608	19.6514	(87)
Th 2	19.8188	19.8293	19.8397	19.8887	19.8979	19.9412	19.9412	19.9493	19.9245	19.8979	19.8793	19.8598	(88)
util rest of house													
	0.9861	0.9774	0.9590	0.9107	0.8043	0.5992	0.4024	0.4350	0.6951	0.9092	0.9738	0.9882	(89)
MIT 2	18.6020	18.7886	19.0673	19.4727	19.7360	19.9153	19.9384	19.9452	19.8682	19.5550	19.0812	18.6611	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	19.0255	19.2099	19.4877	19.8840	20.1575	20.3410	20.3737	20.3762	20.2916	19.9633	19.4874	19.0717	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8755	19.0599	19.3377	19.7340	20.0075	20.1910	20.2237	20.2262	20.1416	19.8133	19.3374	18.9217	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9824	0.9727	0.9534	0.9068	0.8101	0.6227	0.4352	0.4673	0.7138	0.9067	0.9693	0.9850	(94)
Useful gains	503.9907	545.0515	563.1088	548.0406	488.8804	356.2088	239.5822	250.0002	375.4247	463.5049	476.0871	484.2383	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1101.3427	1059.0613	950.5061	763.8385	580.2139	373.2634	241.9246	253.2593	410.5170	643.4712	871.0646	1068.4988	(97)
Space heating kWh													
	444.4298	345.4146	288.2235	155.3744	67.9521	0.0000	0.0000	0.0000	0.0000	133.8949	284.3838	434.6898	(98a)
Space heating requirement - total per year (kWh/year)												2154.3631	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	444.4298	345.4146	288.2235	155.3744	67.9521	0.0000	0.0000	0.0000	0.0000	133.8949	284.3838	434.6898	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2154.3631	
Space heating per m2											(98c) / (4) =	37.8689	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	84.0000	(206)
Efficiency of main space heating system 2 (in %)	0.0000	(207)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	444.4298	345.4146	288.2235	155.3744	67.9521	0.0000	0.0000	0.0000	0.0000	133.8949	284.3838	434.6898	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													

	529.0831	411.2078	343.1233	184.9696	80.8954	0.0000	0.0000	0.0000	0.0000	159.3987	338.5522	517.4878	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
Efficiency of water heater												75.0000	(216)
(217)m	80.9565	80.7018	80.1959	79.1213	77.4998	75.0000	75.0000	75.0000	75.0000	78.7595	80.2818	80.9342	(217)
Fuel for water heating, kWh/month													
	250.4489	221.0525	234.9382	207.5592	203.5680	187.4572	184.2243	193.3753	197.2840	211.5843	222.6521	247.7465	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	16.3697	13.1324	11.8243	8.6630	6.6915	5.4670	6.1042	7.9345	10.3061	13.5222	15.2733	16.8247	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)

Annual totals kWh/year		
Space heating fuel - main system 1	2564.7179	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	75.0000	
Water heating fuel used	2561.8904	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	115.0000	(230c)
Total electricity for the above, kWh/year	115.0000	(231)
Electricity for lighting (calculated in Appendix L)	132.1128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	0.0000	(233)
Wind generation	0.0000	(234)
Hydro-electric generation (Appendix N)	0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)	0.0000	(235)
Appendix Q - special features		
Energy saved or generated	-0.0000	(236)
Energy used	0.0000	(237)
Total delivered energy for all uses	5373.7212	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2564.7179	3.6400	93.3557	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2561.8904	3.6400	93.2528	(247)
Energy for instantaneous electric shower(s)	0.0000	16.4900	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	16.4900	18.9635	(249)
Energy for lighting	132.1128	16.4900	21.7854	(250)
Additional standing charges			92.0000	(251)
Total energy cost			319.3574	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.1284	(257)
SAP value		81.7093	
SAP rating (Section 12)		82	(258)
SAP band		B	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2564.7179	0.2100	538.5908	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2561.8904	0.2100	537.9970	(264)
Space and water heating			1076.5878	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	132.1128	0.1443	19.0680	(268)
Total CO2, kg/year			1111.6076	(272)
CO2 emissions per m2			19.5400	(273)
EI value			85.3808	
EI rating			85	(274)
EI band			B	

SAP 10 WORKSHEET FOR Conversion (As Designed) (Version 10.2, February 2022)
CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	56.8900 (1b)	x	2.1500 (2b)	=	122.3135	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	56.8900					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	122.3135	(5)

2. Ventilation rate

	m3 per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	2 * 10 =	20.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
	Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1635 (8)
Pressure test		No
Pressure Test Method		Blower Door
Measured/design AP50		15.0000 (17)
Infiltration rate		0.9135 (18)
Number of sides sheltered		2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.7765 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	4.8000	4.7000	4.6000	4.2000	4.1000	3.7000	3.7000	3.7000	3.7000	4.2000	4.3000	4.5000	(22)
Wind factor	1.2000	1.1750	1.1500	1.0500	1.0250	0.9250	0.9250	0.9250	0.9250	1.0500	1.0750	1.1250	(22a)
Adj infilt rate	0.9318	0.9124	0.8930	0.8153	0.7959	0.7183	0.7183	0.7183	0.7183	0.8153	0.8347	0.8735	(22b)
Effective ac	0.9341	0.9162	0.8987	0.8324	0.8167	0.7579	0.7579	0.7579	0.7579	0.8324	0.8484	0.8815	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
New Glazing (Uw = 1.40)			4.5000	1.3258	5.9659			(27)
External Wall 1	10.9000	1.1800	9.7200	0.3000	2.9160			(29a)
Dormer Wall 1	10.5600	3.3200	7.2400	0.1800	1.3032			(29a)
External Roof 1	26.6500		26.6500	0.1600	4.2640			(30)
Dormer Roof 1	9.8400		9.8400	0.1600	1.5744			(30)
Slope Roof 1	22.1800		22.1800	0.1600	3.5488			(30)
Total net area of external elements Aum(A, m2)			80.1300					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	19.5723			(33)
Party Floor 1			56.8900					(32d)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)
Thermal bridges (Default value 0.200 * total exposed area)							16.0260	(36)
Point Thermal bridges						(36a) =	0.0000	
Total fabric heat loss					(33) + (36) + (36a) =		35.5983	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	37.7040	36.9815	36.2742	33.5972	32.9660	30.5932	30.5932	30.5932	30.5932	33.5972	34.2436	35.5821	(38)
Heat transfer coeff	73.3023	72.5798	71.8725	69.1955	68.5643	66.1915	66.1915	66.1915	66.1915	69.1955	69.8419	71.1804	(39)
Average = Sum(39)m / 12 =												69.2082	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2885	1.2758	1.2634	1.2163	1.2052	1.1635	1.1635	1.1635	1.1635	1.2163	1.2277	1.2512	(40)
HLP (average)												1.2165	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy											1.8925	(42)
Hot water usage for mixer showers	62.8459	61.9014	60.5252	57.8920	55.9487	53.7816	52.5499	53.9157	55.4129	57.7397	60.4295	62.6051	(42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42b)
Hot water usage for other uses	34.0109	32.7741	31.5374	30.3006	29.0639	27.8271	27.8271	29.0639	30.3006	31.5374	32.7741	34.0109	(42c)
Average daily hot water use (litres/day)												88.8608	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	96.8568	94.6756	92.0625	88.1926	85.0126	81.6087	80.3770	82.9796	85.7135	89.2771	93.2036	96.6160	(44)
Energy conte	153.3974	134.8167	141.4967	120.7312	114.4433	100.3475	97.2090	102.7460	105.6934	121.1482	132.7856	151.2773	(45)
Energy content (annual)										Total = Sum(45)m =		1476.0922	
Distribution loss (46)m = 0.15 x (45)m	23.0096	20.2225	21.2245	18.1097	17.1665	15.0521	14.5813	15.4119	15.8540	18.1722	19.9178	22.6916	(46)
Water storage loss:													
Total storage loss													

	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	49.3571	43.5767	46.9141	43.4922	43.3215	40.2454	40.9592	42.2855	42.2697	45.4946	45.9634	49.2344	(61)
Total heat required for water heating calculated for each month												
	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h												
	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
										Total per year (kWh/year) = Sum(64)m =		2009.2061	(64)
Electric shower(s)												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month												
	63.3439	55.7207	58.7762	51.0162	48.8828	43.4269	42.5618	44.7344	45.7105	51.6554	55.6421	62.6083	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	113.5489	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	18.7019	16.6109	13.5089	10.2271	7.6449	6.4541	6.9739	9.0650	12.1670	15.4488	18.0310	19.2217	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	246.3300	248.8862	242.4448	228.7319	211.4217	195.1527	184.2839	181.7278	188.1692	201.8821	219.1922	235.4613	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	48.2474	(69)
Pumps, fans	7.0000	7.0000	7.0000	7.0000	7.0000	0.0000	0.0000	0.0000	0.0000	7.0000	7.0000	7.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	-75.6993	(71)
Water heating gains (Table 5)													
	85.1397	82.9178	79.0002	70.8558	65.7026	60.3151	57.2067	60.1269	63.4868	69.4293	77.2807	84.1509	(72)
Total internal gains													
	443.2687	441.5118	428.0509	402.9118	377.8663	348.0189	334.5616	337.0167	349.9199	379.8572	407.6009	431.9310	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southeast	3.3200	33.9635	0.7600	0.8000	0.7700	47.5103	(77)
Southwest	1.1800	33.9635	0.7600	0.8000	0.7700	16.8862	(79)

Solar gains	64.3965	112.2302	160.8974	204.1444	224.4748	227.3785	212.5493	191.6259	176.0518	129.3447	78.4956	56.8595	(83)
Total gains	507.6652	553.7420	588.9483	607.0561	602.3410	575.3975	547.1109	528.6425	525.9717	509.2019	486.0965	488.7905	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, ni1,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	53.8959	54.4324	54.9681	57.0947	57.6203	59.6859	59.6859	59.6859	59.6859	57.0947	56.5662	55.5025	
alpha	4.5931	4.6288	4.6645	4.8063	4.8414	4.9791	4.9791	4.9791	4.9791	4.8063	4.7711	4.7002	
util living area													
	0.9886	0.9819	0.9668	0.9268	0.8387	0.6777	0.5428	0.5704	0.7690	0.9339	0.9790	0.9902	(86)
MIT	19.7264	19.8892	20.1537	20.5145	20.7912	20.9492	20.9859	20.9821	20.9018	20.5584	20.1324	19.7357	(87)
Th 2	19.8499	19.8598	19.8696	19.9070	19.9158	19.9493	19.9493	19.9493	19.9493	19.9070	19.8979	19.8793	(88)
util rest of house													
	0.9849	0.9761	0.9557	0.9016	0.7830	0.5834	0.4257	0.4519	0.6858	0.9060	0.9711	0.9870	(89)
MIT 2	18.7278	18.8955	19.1613	19.5337	19.7831	19.9272	19.9455	19.9443	19.8996	19.5798	19.1661	18.7597	(90)
Living area fraction										fLA = Living area / (4) =		0.4147	(91)
MIT	19.1419	19.3075	19.5728	19.9404	20.2011	20.3510	20.3769	20.3746	20.3152	19.9856	19.5668	19.1644	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.9919	19.1575	19.4228	19.7904	20.0511	20.2010	20.2269	20.2246	20.1652	19.8356	19.4168	19.0144	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9812	0.9714	0.9502	0.8984	0.7908	0.6074	0.4576	0.4840	0.7045	0.9038	0.9665	0.9837	(94)
Useful gains	498.1100	537.8822	559.5920	545.3735	476.3065	349.4702	250.3386	255.8772	370.5560	460.2296	469.8255	480.8307	(95)
Ext temp.	4.7000	5.2000	6.7000	9.1000	12.0000	14.7000	16.4000	16.3000	14.1000	10.7000	7.5000	4.6000	(96)
Heat loss rate W													
	1047.6272	1013.0335	914.4204	739.7272	552.0211	364.1182	253.3094	259.7755	401.4622	632.1424	832.2910	1026.0213	(97)
Space heating kWh													
	408.8408	319.3017	263.9923	139.9347	56.3316	0.0000	0.0000	0.0000	0.0000	127.9032	260.9752	405.6219	(98a)
Space heating requirement - total per year (kWh/year)												1982.9013	
Solar heating kWh													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh													
	408.8408	319.3017	263.9923	139.9347	56.3316	0.0000	0.0000	0.0000	0.0000	127.9032	260.9752	405.6219	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1982.9013	
Space heating per m2											(98c) / (4) =	34.8550	(99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)

Efficiency of main space heating system 1 (in %)												84.0000	(206)
Efficiency of main space heating system 2 (in %)												0.0000	(207)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	408.8408	319.3017	263.9923	139.9347	56.3316	0.0000	0.0000	0.0000	0.0000	127.9032	260.9752	405.6219	(98)
Space heating efficiency (main heating system 1)													
	84.0000	84.0000	84.0000	84.0000	84.0000	0.0000	0.0000	0.0000	0.0000	84.0000	84.0000	84.0000	(210)
Space heating fuel (main heating system)													
	486.7152	380.1210	314.2766	166.5889	67.0615	0.0000	0.0000	0.0000	0.0000	152.2657	310.6848	482.8832	(211)
Space heating efficiency (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (main heating system 2)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	202.7546	178.3934	188.4108	164.2235	157.7647	140.5929	138.1682	145.0315	147.9630	166.6428	178.7490	200.5117	(64)
Efficiency of water heater												75.0000	(216)
(217)m	80.7862	80.5359	80.0018	78.8887	77.1756	75.0000	75.0000	75.0000	75.0000	78.6597	80.0930	80.7928	(217)
Fuel for water heating, kWh/month													
	250.9769	221.5079	235.5081	208.1711	204.4230	187.4572	184.2243	193.3753	197.2840	211.8528	223.1768	248.1802	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.7671	8.8219	9.7671	9.4521	9.7671	9.4521	9.7671	9.7671	9.4521	9.7671	9.4521	9.7671	(231)
Lighting	16.3697	13.1324	11.8243	8.6630	6.6915	5.4670	6.1042	7.9345	10.3061	13.5222	15.2733	16.8247	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												2360.5968	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												75.0000	
Water heating fuel used												2566.1375	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												115.0000	(230c)
Total electricity for the above, kWh/year												115.0000	(231)
Electricity for lighting (calculated in Appendix L)												132.1128	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												0.0000	(233)
Wind generation												0.0000	(234)
Hydro-electric generation (Appendix N)												0.0000	(235a)
Electricity generated - Micro CHP (Appendix N)												0.0000	(235)
Appendix Q - special features													
Energy saved or generated												-0.0000	(236)
Energy used												0.0000	(237)
Total delivered energy for all uses												5173.8471	(238)

10a. Fuel costs - using BEDF prices (551)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2360.5968	5.6000	132.1934	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2566.1375	5.6000	143.7037	(247)
Energy for instantaneous electric shower(s)	0.0000	26.0600	0.0000	(247a)
Pumps, fans and electric keep-hot	115.0000	26.0600	29.9690	(249)
Energy for lighting	132.1128	26.0600	34.4286	(250)
Additional standing charges			99.0000	(251)
Total energy cost			439.2947	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	2360.5968	0.2100	495.7253	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2566.1375	0.2100	538.8889	(264)
Space and water heating			1034.6142	(265)
Pumps, fans and electric keep-hot	115.0000	0.1387	15.9519	(267)
Energy for lighting	132.1128	0.1443	19.0680	(268)
Total CO2, kg/year			1069.6341	(272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2360.5968	1.1300	2667.4744	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2566.1375	1.1300	2899.7354	(278)
Space and water heating			5567.2098	(279)
Pumps, fans and electric keep-hot	115.0000	1.5128	173.9720	(281)

Energy for lighting	132.1128	1.5338	202.6391 (282)
Total Primary energy kWh/year			5943.8208 (286)

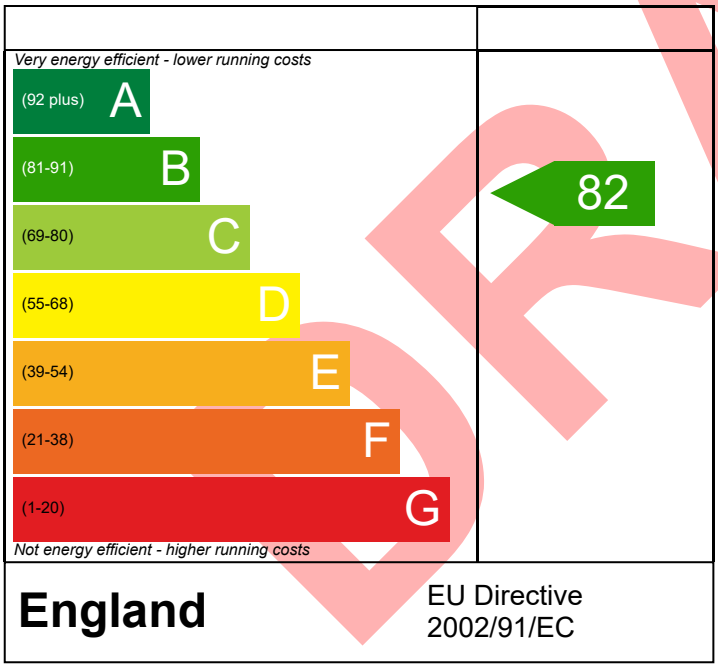
Predicted Energy Assessment

Dwelling type:	Flat, Detached
Date of assessment:	01/10/2024
Produced by:	Aharon Horwich
Total floor area:	56.89 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

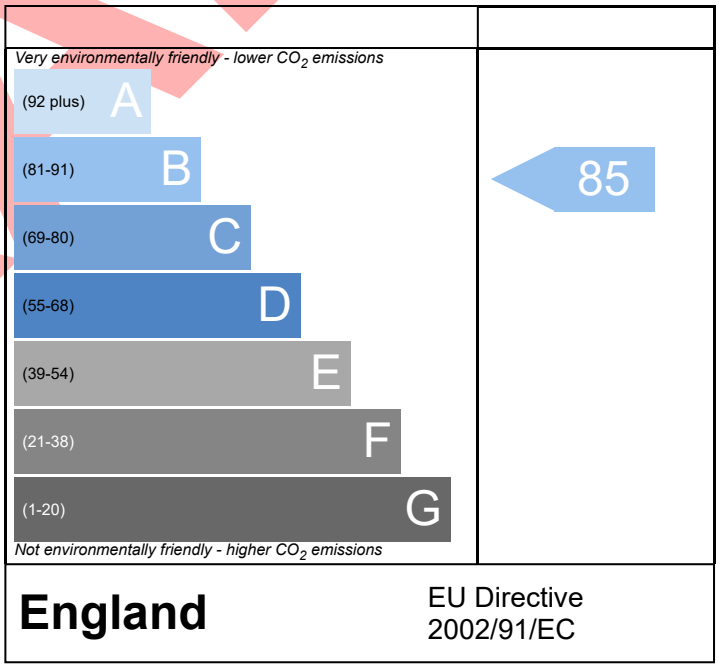
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

DRAFT

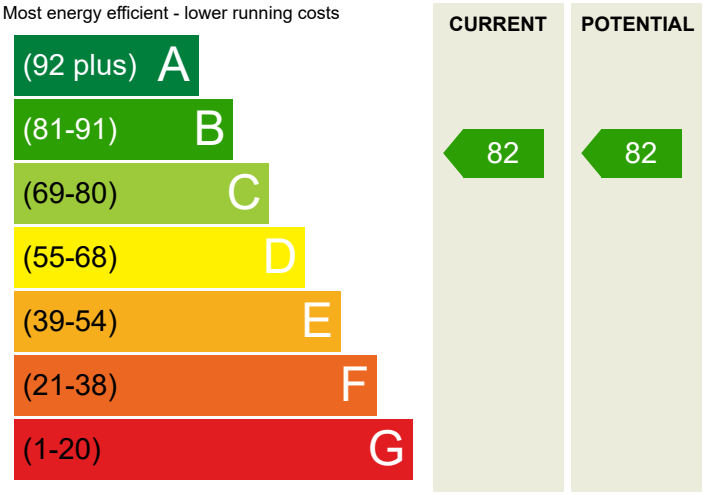
Energy Report

Dwelling Address	
Reference	Apt. 11-Apt. 11
Assessment Date	30/09/2024
Submission Date	
Property Type	Flat, Detached
Total Floor Area	57

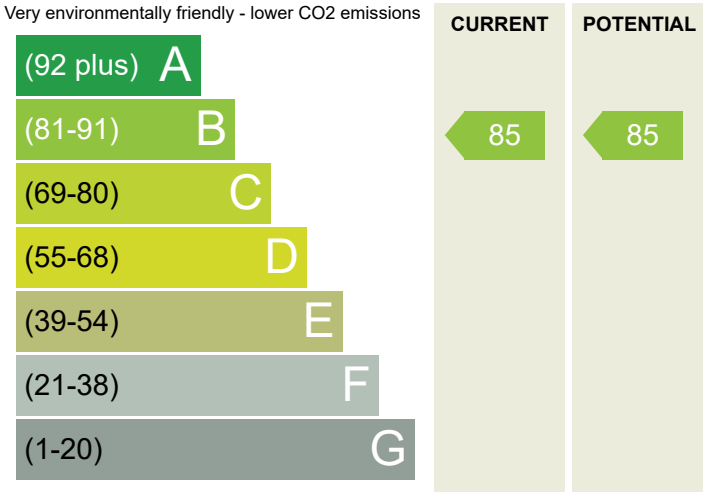
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

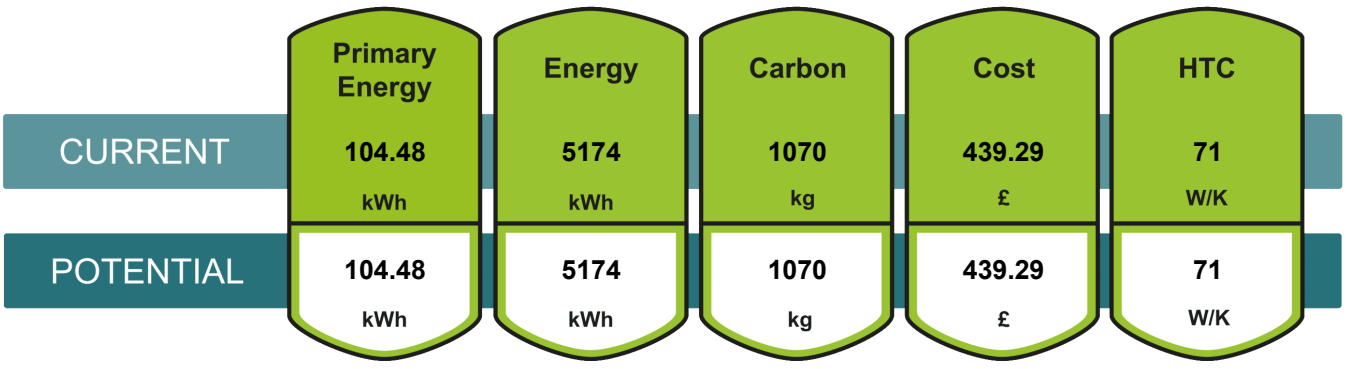
Energy Efficiency Rating



Carbon Dioxide (CO2) Emissions Rating



Additional ratings for your home



Energy Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.25 W/m²K	Very Good
Roof	Average thermal transmittance 0.16 W/m²K	Very Good
Windows	High performance glazing	Good
Main heating	Boiler and radiators, mains gas	Good
Main heating controls	Programmer, room thermostat and TRVs	Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Excelent lighting efficiency	Very Good
Air tightness	(not tested)	

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measures	Cumulative savings (per year)	Cumulative rating	Typical costs	Incremental savings (per year)	Cumulative CO2 rating

The typical cost is based on average installation prices across the country so may not be representative of the actual costs in your area.

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total

energy cost if all recommended measures named above were installed.

	Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting	£34	£34	You could save £0
Heating	£261	£261	
Hot Water	£144	£144	
New Technologies e.g. Impact of PV	£0	£0	
TOTAL	£439	£439	

Estimated energy use and potential savings

Space Heating
2361
kWh per year

Water Heating
2566
kWh per year

About this document

Created by:	
Company/Trading name:	
Phone number:	
Email address:	

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g.heating system) is working correctly.
This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.
The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Energy Report

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO2)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Dwelling Sign Off Report

Property Reference	Apt. 11	Issued on Date	01/10/2024
Assessment Reference	Apt. 11	Prop Type Ref	Detached Flat
Property			

SAP Rating	82 B	DER	19.98	TER	
Environmental	85 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.07	DFEE	45.01	TFEE	
Compliance Check	See BREL	% DFEE < TFEE			
% DPER < TPER		DPER	110.84	TPER	

Assessor Details	Mr. Aharon Horwich	Assessor ID	AV59-0001
Client			

This report should be used for a client to confirm key assessment details for production of Energy Performance Certificates and should be retained as documentary evidence. It cannot be used in lieu of a BREL/BRWL/Compliance report for demonstrating Building Regulation compliance.

Section 1: Dwelling Information

Dwelling Address (Please confirm final postal address and post code of the dwelling.)

House Name		
House Number		
Postcode		
Street		
Town		
County		

Dwelling Orientation Northeast (Please confirm orientation of main entrance door of the dwelling.)

Comments

Terrain Type Suburban

Property Type Flat, Detached

Comments

Electricity Tariff Standard

Smart electricity meter fitted No

Smart gas meter fitted No

Comments

Section 2: Dwelling Construction Details

External Walls

Description	External Wall 1		
Type	Solid Wall		
Construction	Other		
U-value	0.30	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	10.90	m²	

Description	Dormer Wall 1		
Type	Timber Frame		
Construction	Other		
U-value	0.18	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	10.56	m²	

Comments

External Roofs

Description	External Roof 1		
Type	External Plane Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	26.65	m²	

Description	Dormer Roof 1		
Type	External Flat Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	9.84	m²	

Description	Slope Roof 1		
Type	External Slope Roof		
Construction	Other		
U-value	0.16	W/m²K	U-value calculations should be provided to verify the u-value entered into the Assessment
Gross Area	22.18	m²	

Comments

Opening Types

Description	Data Source	Type	Glazing	G-value	Frame Type	U-Value (W/m²K)
New Glazing	Manufacturer	Window	Double glazed	0.76		1.40
New Door	Manufacturer	Solid Door		0.00		1.40
Existing Glazing	SAP table	Window	Double glazed	0.76	Wood	3.10

Comments

Openings

Name	Opening Type	Location	Orientation	Area (m²)
W NW1	New Glazing	Dormer Wall 1	South East	3.32
W SW1	New Glazing	External Wall 1	South West	1.18

Comments

Thermal Bridging Default

Y-value 0.200

Comments

Where specific construction details have been used documentary evidence should be provided to the SAP assessor, usually in the form of signed checklists.

Pressure Testing No

Property Tested? Yes

Test Method Blower Door

Where an air pressure test has been carried out a copy of the test certificate should be forwarded to the SAP assessor.

Comments

Section 3: Dwelling Systems

Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	2
Number of passive vents	0
Number of flueless gas fires	0

Comments

Fixed Cooling System No

Comments

Lighting

No Fixed Lighting No

Name	Efficacy (lm/W)	Power (W)	Capacity (lm)	Count
Lighting 1	185.00	10.00	1850.00	10

Comments

Main Heating 1

	SAP table	
Fuel Type	Mains gas	
Winter Efficiency	84.00	%
Summer Efficiency	75.00	%
Model Name		
Manufacturer		
System Type		
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Heat Emitter	Radiators	
Flow Temperature	Unknown	
Flow Temperature Value		

Comments

Heating Controls

Description	Programmer, room thermostat and TRVs
Boiler Interlock	Yes
Delayed Start Stat	Yes
PCDF Control Description	

Comments

Main Heating 2 None

Secondary Heating None

Water Heating System

Water Heating	Main Heating 1
Supplementary Immersion	No
SAP Code	901
Water use <= 125 l/p/day	Yes
Cold Water Source	From mains
Number of baths	0

Comments

Hot Water Cylinder None

Comments

Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Vented hot water system	7.00		No	

Comments

Waste Water Heat Recovery System

Comments

Section 4: Dwelling Renewable Energy

Photovoltaic Unit None

Section 5: Declaration

I confirm to the best of my knowledge the details provided in this report are an accurate representation of how the dwelling has been constructed.

Signed .....

Date .....

Compliance 4 Buildings Ltd

Contact Us

Head Office:
Compliance 4 Buildings Ltd
88 North Street, Hornchurch, Essex, RM11 1SR

Tel: 0203 556 2407
Email: info@compliance4buildings.co.uk
Website: www.compliance4buildings.co.uk

Opening hours: Mon-Fri: 9:00 – 17:00