

Energy Report

Dwelling Address	Bluestone Drive, 9, Stockport, Greater Manchester, SK4 3PX
Reference	Plot 05 Church Lane, Middleton-Church Lane, Middleton
Assessment Date	03/06/2025
Submission Date	
Property Type	House, Detached
Total Floor Area	164

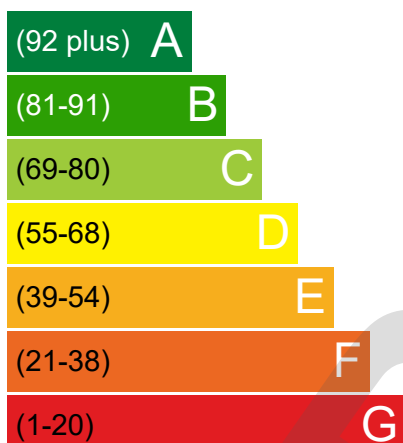
This Energy Report has been generated using the UK's National Calculation Methodology for dwellings, Standard Assessment Procedure (SAP). This methodology is used to assess the energy efficiency of dwellings which is calculated based on a dwelling's heating, hot water, ventilation and lighting usage.

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

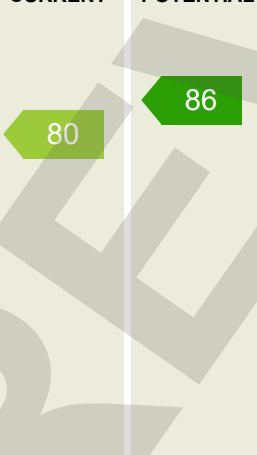
Energy Efficiency Rating

Carbon Dioxide (CO2) Emissions Rating

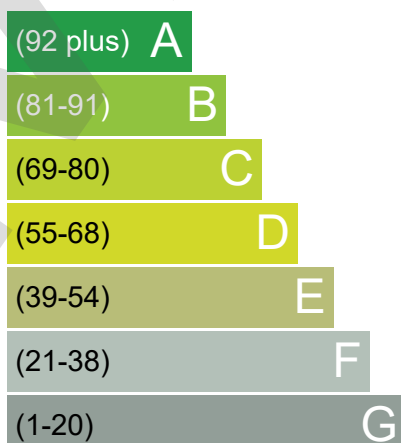
Most energy efficient - lower running costs



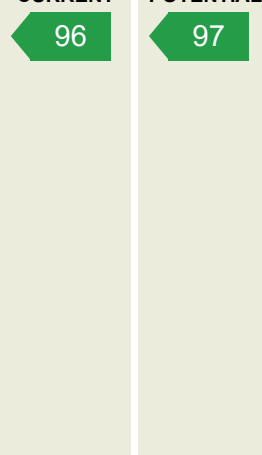
CURRENT POTENTIAL



Very environmentally friendly - lower CO2 emissions



CURRENT POTENTIAL



Additional ratings for your home

	Primary Energy	Energy	Carbon	Cost	HTC
CURRENT	38.90 kWh	4110 kWh	615 kg	1071.08 £	188 W/K
POTENTIAL	28.19 kWh	2926 kWh	459 kg	762.51 £	188 W/K

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
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Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.16 W/m ² K	Very Good
Floor	Average thermal transmittance 0.12 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, radiators and underfloor, electric	Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Good lighting efficiency	Good
Air tightness	Air permeability [AP50] = 5.0 m ³ /h.m ² (assumed)	Good

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
Solar water heating	£71	B 81	£4,000 - £6,000	£71	A 96
Photovoltaic	£309	B 86	£3,500 - £5,500	£238	A 97

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 	£77	£77	
Heating 	£571	£592	
Hot Water 	£423	£331	
New Technologies e.g. Impact of PV	£0	-(£238)	
TOTAL	£1071	£763	

Estimated energy use and potential savings



Space Heating
2191
kWh per year



Water Heating
1625
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.

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 (CO ₂)	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.

Predicted Energy Assessment



Bluestone Drive, 9, Stockport, Greater Manchester, SK4 3PX

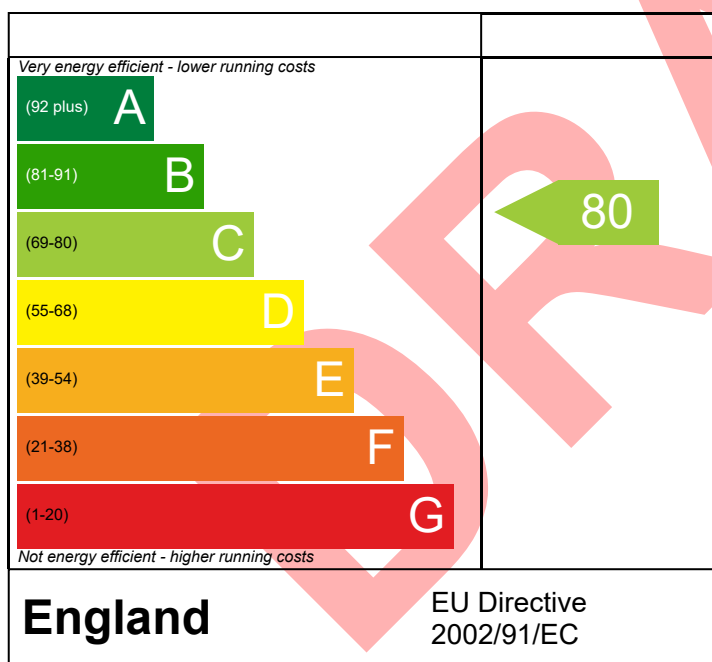
Dwelling type:
Date of assessment:
Produced by:
Total floor area:
DRRN:

House, Detached
10/06/2025
Daniel Watt
164.15 m²

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.

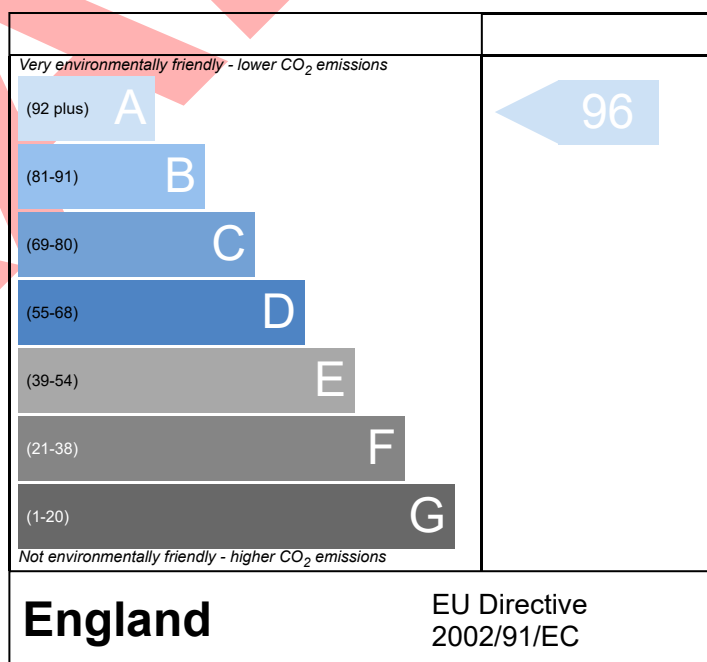
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.

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 (CO₂) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Full SAP Calculation Printout



Property Reference	Plot 05 Church Lane, Middleton				Issued on Date	10/06/2025
Assessment Reference	Church Lane,Middleton	Prop Type Ref	Church Lane, Middleton			
Property	Bluestone Drive, 9, Stockport, Greater Manchester, SK4 3PX					
SAP Rating	80 C	DER	4.07	TER	10.89	
Environmental	96 A	% DER < TER				62.63
CO ₂ Emissions (t/year)	0.62	DFEE	43.21	TFEE	43.74	
Compliance Check	See BREL	% DFEE < TFEE				1.20
% DPER < TPER	26.02	DPER	42.25	TPER	57.11	
Assessor Details	Mr. Daniel Watt				Assessor ID	AV75-0001
Client						

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	58.1600 (1b)	x 2.4000 (2b)	= 139.5840 (1b) - (3b)
First floor	56.8200 (1c)	x 2.6000 (2c)	= 147.7320 (1c) - (3c)
Second floor	49.1700 (1d)	x 2.9000 (2d)	= 142.5930 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	164.1500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 429.9090 (5)

2. Ventilation rate

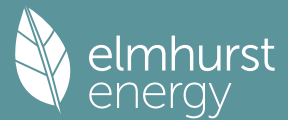
		m ³ per hour
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	4 * 10 =	40.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c)	40.0000 / (5) =	0.0930 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3430	(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) =	0.3173 (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	0.4046	0.3966	0.3887	0.3490	0.3411	0.3014	0.3014	0.2935	0.3173	0.3411	0.3570	0.3728 (22b)
Effective ac	0.5818	0.5787	0.5755	0.5609	0.5582	0.5454	0.5454	0.5431	0.5503	0.5582	0.5637	0.5695 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			2.0000	1.3000	2.6000		(26)
Window			28.0400	1.2357	34.6502		(27)
Roof Light			2.4000	1.2357	2.9658		(27a)
Heatloss Floor 1			58.1600	0.1200	6.9792	110.0000	6397.6000 (28a)
External Wall	233.4600	30.0400	203.4200	0.1800	36.6156	140.0000	28478.8009 (29a)
External Roof	61.4600	2.4000	59.0600	0.1600	9.4496	9.0000	531.5400 (30)
Total net area of external elements Aum(A, m ²)			353.0800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	93.2604		(33)
Main dwelling							
Internal Wall			234.2200			100.0000	23422.0001 (32c)
Internal Floor			56.8200			18.0000	1022.7600 (32d)
Internal Floor			49.1700			18.0000	885.0600 (32d)
Internal Ceiling			56.8200			9.0000	511.3800 (32e)
Internal Ceiling			49.1700			9.0000	442.5300 (32e)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	61691.6711 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							375.8250 (35)
List of Thermal Bridges							

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	20.6000	0.0300	0.6180
E3 Sill	19.6500	0.0400	0.7860
E4 Jamb	56.2000	0.0500	2.8100
E5 Ground floor (normal)	32.0100	0.1600	5.1216
E6 Intermediate floor within a dwelling	40.7000	0.0010	0.0407
E16 Corner (normal)	44.6000	0.0900	4.0140
E17 Corner (inverted - internal area greater than external area)	13.0000	-0.0900	-1.1700
E11 Eaves (insulation at rafter level)	13.4000	0.0400	0.5360
E13 Gable (insulation at rafter level)	26.4800	0.0400	1.0592
R1 Head of roof window	3.2000	0.0800	0.2560
R2 Sill of roof window	3.2000	0.0600	0.1920
R3 Jamb of roof window	6.0000	0.0800	0.4800
R4 Ridge (vaulted ceiling)	14.7000	0.0500	0.7350
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			15.4785 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	108.7389 (37)

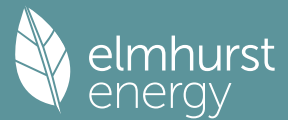
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	82.5458	82.0949	81.6530	79.5772	79.1889	77.3810	77.3810	77.0462	78.0773	79.1889	79.9745	80.7959
Average = Sum(39)m / 12 =	191.2846	190.8338	190.3918	188.3161	187.9277	186.1198	186.1198	185.7850	186.8162	187.9277	188.7134	189.5348
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1653	1.1626	1.1599	1.1472	1.1449	1.1338	1.1338	1.1318	1.1381	1.1449	1.1496	1.1546
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.9547 (42)
Hot water usage for mixer showers												
Hot water usage for baths												
Hot water usage for other uses												
Average daily hot water use (litres/day)												135.9578 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	147.9174	144.7144	140.7913	135.6623	130.8918	124.8894	121.4730	127.1499	130.8417	136.8029	142.9413	147.8278
Energy content (annual)	217.7599	191.4864	201.1879	177.2089	168.6673	144.4304	134.2312	149.6578	151.7698	176.2844	193.1899	217.0960
Distribution loss (46)m = 0.15 x (45)m												2122.9699
Water storage loss:												
Store volume												300.0000 (47)
b) If manufacturer declared loss factor is not known :												
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0103 (51)
Volume factor from Table 2a												0.7368 (52)
Temperature factor from Table 2b												0.5400 (53)
Enter (49) or (54) in (55)												1.2281 (55)
Total storage loss												
If cylinder contains dedicated solar storage												
Primary loss												
Combi loss												
Total heat required for water heating calculated for each month												
WWHRS												
PV diverter												
Solar input												
FGHRS												
Output from w/h												
Electric shower(s)												
Heat gains from water heating, kWh/month												

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
Pumps, fans												
Losses e.g. evaporation (negative values) (Table 5)												
Water heating gains (Table 5)												
Total internal gains												

6. Solar gains												
[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							

Full SAP Calculation Printout



North			2.3500		10.6334		0.7000		0.7000		0.7700		8.4853 (74)
East			12.5500		19.6403		0.7000		0.7000		0.7700		83.6990 (76)
South			4.7900		46.7521		0.7000		0.7000		0.7700		76.0441 (78)
West			8.3500		19.6403		0.7000		0.7000		0.7700		55.6882 (80)
North			2.4000		26.0000		0.7000		0.7000		1.0000		27.5184 (82)

Solar gains	251.4351	470.5811	736.8541	1037.2337	1252.2980	1276.9427	1217.5348	1055.9776	842.8308	547.0332	309.3326	209.6346	(83)
Total gains	1071.9726	1289.0804	1530.5085	1787.6159	1955.2737	1935.5079	1848.4527	1693.2551	1503.3247	1251.4176	1065.0995	1008.9377	(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	89.5868	89.7984	90.0069	90.9990	91.1870	92.0728	92.0728	92.2387	91.7296	91.1870	90.8074	90.4139	
alpha	6.9725	6.9866	7.0005	7.0666	7.0791	7.1382	7.1382	7.1492	7.1153	7.0791	7.0538	7.0276	
util living area	0.9997	0.9987	0.9928	0.9548	0.8219	0.6079	0.4423	0.5028	0.8001	0.9842	0.9990	0.9998	(86)
MIT	20.2131	20.3311	20.5212	20.7556	20.9068	20.9513	20.9560	20.9554	20.9260	20.7027	20.4096	20.1940	(87)
Th 2	19.9479	19.9501	19.9522	19.9625	19.9644	19.9733	19.9733	19.9749	19.9699	19.9644	19.9605	19.9565	(88)
util rest of house	0.9995	0.9980	0.9889	0.9321	0.7564	0.5144	0.3396	0.3919	0.7068	0.9724	0.9983	0.9997	(89)
MIT 2	19.0283	19.1812	19.4248	19.7185	19.8747	19.9154	19.9173	19.9189	19.8984	19.6637	19.2908	19.0110	(90)
Living area fraction									FLA = Living area / (4) =				0.1654 (91)
MIT	19.2243	19.3714	19.6061	19.8900	20.0454	20.0868	20.0891	20.0903	20.0684	19.8356	19.4759	19.2067	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.2243	19.3714	19.6061	19.8900	20.0454	20.0868	20.0891	20.0903	20.0684	19.8356	19.4759	19.2067	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9993	0.9974	0.9871	0.9302	0.7620	0.5250	0.3512	0.4045	0.7166	0.9703	0.9979	0.9996	(94)
Useful gains	1071.2483	1285.7198	1510.7924	1662.8084	1489.9886	1016.1405	649.1489	684.9721	1077.3026	1214.3124	1062.8167	1008.4905	(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	2854.7886	2761.6354	2495.3039	2069.5953	1568.3263	1021.1943	649.3898	685.6087	1114.9920	1735.6189	2335.4907	2844.2863	(97)
Space heating kWh	1326.9539	991.8153	732.4766	292.8866	58.2833	0.0000	0.0000	0.0000	0.0000	387.8520	916.3253	1365.8321	(98a)
Space heating requirement - total per year (kWh/year)												6072.4250	
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	1326.9539	991.8153	732.4766	292.8866	58.2833	0.0000	0.0000	0.0000	0.0000	387.8520	916.3253	1365.8321	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6072.4250	
Space heating per m2										(98c) / (4) =		36.9931	(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 %)													249.9000 (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	1326.9539	991.8153	732.4766	292.8866	58.2833	0.0000	0.0000	0.0000	0.0000	387.8520	916.3253	1365.8321	(98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000	(210)
Space heating fuel (main heating system)	530.9940	396.8849	293.1079	117.2015	23.3226	0.0000	0.0000	0.0000	0.0000	155.2029	366.6768	546.5514	(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	279.0921	246.8832	262.5201	236.5626	229.9995	203.7841	195.5634	210.9900	211.1236	237.6166	252.5436	278.4282	(64)
Efficiency of water heater	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	(216)
Fuel for water heating, kWh/month	159.3901	140.9955	149.9258	135.1014	131.3532	116.3816	111.6867	120.4968	120.5731	135.7034	144.2282	159.0110	(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	36.4968	29.2791	26.3626	19.3144	14.9190	12.1889	13.6096	17.6903	22.9779	30.1482	34.0524	37.5112	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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												2429.9420	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)

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Efficiency of water heater	175.1000	
Water heating fuel used	1624.8470	(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)	294.5503	(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	4349.3392	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2429.9420	16.4900	400.6974	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1624.8470	16.4900	267.9373	(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	294.5503	16.4900	48.5713	(250)
Additional standing charges			0.0000	(251)
Total energy cost			717.2060	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)	$[(255) \times (256)] / [(4) + 45.0] =$	1.2345	(257)
SAP value		79.9889	
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	2429.9420	0.1565	380.3012	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1624.8470	0.1408	228.8581	(264)
Space and water heating			609.1593	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	294.5503	0.1443	42.5127	(268)
Total CO2, kg/year			651.6720	(272)
CO2 emissions per m2			3.9700	(273)
EI value			95.8248	
EI rating			96	(274)
EI band			A	

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

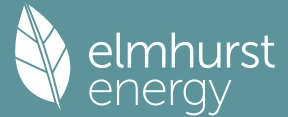
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	58.1600 (1b)	x 2.4000 (2b)	= 139.5840 (1b) - (3b)	
First floor	56.8200 (1c)	x 2.6000 (2c)	= 147.7320 (1c) - (3c)	
Second floor	49.1700 (1d)	x 2.9000 (2d)	= 142.5930 (1d) - (3d)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	164.1500		(4)	
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	429.9090 (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	4 * 10 =	40.0000	(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) =	40.0000 / (5) =	0.0930 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	

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Measured/design AP50 5.0000 (17)
Infiltration rate 0.3430 (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) = 0.3173 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	4.3000	4.2000	4.3000	3.9000	3.9000	3.4000	3.3000	3.3000	3.4000	3.8000	3.8000	3.9000	(22)
Adj infilt rate	1.0750	1.0500	1.0750	0.9750	0.9750	0.8500	0.8250	0.8250	0.8500	0.9500	0.9500	0.9750	(22a)
Effective ac	0.3411	0.3332	0.3411	0.3094	0.3094	0.2697	0.2618	0.2618	0.2697	0.3014	0.3014	0.3094	(22b)
	0.5582	0.5555	0.5582	0.5479	0.5479	0.5364	0.5343	0.5343	0.5364	0.5454	0.5454	0.5479	(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	
Main dwelling								
Door			2.0000	1.3000	2.6000			(26)
Window			28.0400	1.2357	34.6502			(27)
Roof Light			2.4000	1.2357	2.9658			(27a)
Heatloss Floor 1			58.1600	0.1200	6.9792	110.0000	6397.6000	(28a)
External Wall	233.4600	30.0400	203.4200	0.1800	36.6156	140.0000	28478.8009	(29a)
External Roof	61.4600	2.4000	59.0600	0.1600	9.4496	9.0000	531.5400	(30)
Total net area of external elements Aum(A, m2)			353.0800					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	93.2604		(33)
Main dwelling								
Internal Wall			234.2200			100.0000	23422.0001	(32c)
Internal Floor			56.8200			18.0000	1022.7600	(32d)
Internal Floor			49.1700			18.0000	885.0600	(32d)
Internal Ceiling			56.8200			9.0000	511.3800	(32e)
Internal Ceiling			49.1700			9.0000	442.5300	(32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 61691.6711 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 375.8250 (35)

List of Thermal Bridges	Length	Psi-value	Total
K1 Element			
E2 Other lintels (including other steel lintels)	20.6000	0.0300	0.6180
E3 Sill	19.6500	0.0400	0.7860
E4 Jamb	56.2000	0.0500	2.8100
E5 Ground floor (normal)	32.0100	0.1600	5.1216
E6 Intermediate floor within a dwelling	40.7000	0.0010	0.0407
E16 Corner (normal)	44.6000	0.0900	4.0140
E17 Corner (inverted - internal area greater than external area)	13.0000	-0.0900	-1.1700
E11 Eaves (insulation at rafter level)	13.4000	0.0400	0.5360
E13 Gable (insulation at rafter level)	26.4800	0.0400	1.0592
R1 Head of roof window	3.2000	0.0800	0.2560
R2 Sill of roof window	3.2000	0.0600	0.1920
R3 Jamb of roof window	6.0000	0.0800	0.4800
R4 Ridge (vaulted ceiling)	14.7000	0.0500	0.7350

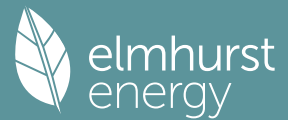
Thermal bridges (Sum(L x Psi) calculated using Appendix K) 15.4785 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 108.7389 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	79.1889	78.8094	79.1889	77.7247	77.7247	76.0953	75.7962	75.7962	76.0953	77.3810	77.3810	77.7247	(38)
Average = Sum(39)m / 12 =	187.9277	187.5483	187.9277	186.4635	186.4635	184.8342	184.5351	184.5351	184.8342	186.1198	186.1198	186.4635	(39)
												186.1477	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.1449	1.1425	1.1449	1.1359	1.1359	1.1260	1.1242	1.1242	1.1260	1.1338	1.1338	1.1359	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9547 (42)
Hot water usage for mixer showers													
Hot water usage for baths	71.8962	70.7955	69.1733	66.6779	64.4420	61.3141	58.8401	61.7323	63.1870	66.2851	69.5115	71.8314	(42a)
Hot water usage for other uses	31.1325	30.6625	29.9939	28.9927	28.0904	26.8482	25.9058	27.0582	27.6630	28.8938	30.1734	31.1078	(42b)
Average daily hot water use (litres/day)	44.8887	43.2563	41.6240	39.9917	38.3594	36.7271	36.7271	38.3594	39.9917	41.6240	43.2563	44.8887	(42c)
												135.9578	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	147.9174	144.7144	140.7913	135.6623	130.8918	124.8894	121.4730	127.1499	130.8417	136.8029	142.9413	147.8278	(44)
Energy content (annual)	217.7599	191.4864	201.1879	177.2089	168.6673	144.4304	134.2312	149.6578	151.7698	176.2844	193.1899	217.0960	(45)
Distribution loss (46)m = 0.15 x (45)m													
Water storage loss:	32.6640	28.7230	30.1782	26.5813	25.3001	21.6646	20.1347	22.4487	22.7655	26.4427	28.9785	32.5644	(46)
Store volume													300.0000 (47)
b) If manufacturer declared loss factor is not known :													
Hot water storage loss factor from Table 2 (kWh/litre/day)													0.0103 (51)
Volume factor from Table 2a													0.7368 (52)
Temperature factor from Table 2b													0.5400 (53)
Enter (49) or (54) in (55)													1.2281 (55)
Total storage loss	38.0698	34.3856	38.0698	36.8417	38.0698	36.8417	38.0698	38.0698	36.8417	38.0698	36.8417	38.0698	(56)
If cylinder contains dedicated solar storage													
Primary loss	38.0698	34.3856	38.0698	36.8417	38.0698	36.8417	38.0698	38.0698	36.8417	38.0698	36.8417	38.0698	(57)
Combi loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Total heat required for water heating calculated for each month	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)
WWHRS	279.0921	246.8832	262.5201	236.5626	229.9995	203.7841	195.5634	210.9900	211.1236	237.6166	252.5436	278.4282	(62)
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	(63a)
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	(63b)
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	(63c)
													(63d)

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Output from w/h	279.0921	246.8832	262.5201	236.5626	229.9995	203.7841	195.5634	210.9900	211.1236	237.6166	252.5436	278.4282 (64)
	Total per year (kWh/year) = Sum(64)m =											2845.1070 (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	121.4709	107.9867	115.9607	106.4049	105.1476	95.5061	93.6976	98.8270	97.9465	107.6803	111.7186	121.2502 (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	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	41.6966	37.0346	30.1185	22.8017	17.0445	14.3897	15.5486	20.2106	27.1267	34.4435	40.2007	42.8555 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	500.7977	505.9944	492.8989	465.0200	429.8279	396.7524	374.6558	369.4591	382.5547	410.4335	445.6256	478.7012 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826 (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)	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863 (71)
Water heating gains (Table 5)	163.2674	160.6945	155.8612	147.7846	141.3275	132.6473	125.9377	132.8319	136.0367	144.7316	155.1648	162.9707 (72)
Total internal gains	820.5375	818.4993	793.6544	750.3821	702.9757	658.5652	630.9179	637.2775	660.4939	704.3845	755.7669	799.3032 (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	
North						2.3500	9.3942		0.7000	0.7000		0.7700	7.4965 (74)	
East						12.5500	17.3606		0.7000	0.7000		0.7700	73.9839 (76)	
South						4.7900	41.2355		0.7000	0.7000		0.7700	67.0713 (78)	
West						8.3500	17.3606		0.7000	0.7000		0.7700	49.2244 (80)	
North						2.4000	23.0000		0.7000	0.7000		1.0000	24.3432 (82)	
Solar gains	222.1192	426.4719	697.7525	1001.9008	1179.9115	1231.6968	1146.1120	988.0639	827.4063	529.8289	290.1958	199.3744	(83)	
Total gains	1042.6567	1244.9712	1491.4069	1752.2829	1882.8872	1890.2620	1777.0299	1625.3413	1487.9002	1234.2134	1045.9626	998.6776	(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	91.1870	91.3715	91.1870	91.9031	91.9031	92.7132	92.8635	92.8635	92.7132	92.0728	92.0728	91.9031
alpha	7.0791	7.0914	7.0791	7.1269	7.1269	7.1809	7.1909	7.1909	7.1809	7.1382	7.1382	7.1269
util living area	0.9996	0.9985	0.9918	0.9417	0.7696	0.5349	0.4046	0.4645	0.7669	0.9792	0.9988	0.9997 (86)
MIT	20.2673	20.3792	20.5588	20.7960	20.9283	20.9548	20.9565	20.9562	20.9355	20.7404	20.4541	20.2465 (87)
Th 2	19.9644	19.9662	19.9644	19.9716	19.9716	19.9796	19.9811	19.9811	19.9796	19.9733	19.9733	19.9716 (88)
util rest of house	0.9994	0.9977	0.9872	0.9123	0.6911	0.4374	0.2992	0.3497	0.6664	0.9631	0.9979	0.9996 (89)
MIT 2	19.1116	19.2564	19.4827	19.7729	19.8994	19.9235	19.9256	19.9255	19.9144	19.7173	19.3585	19.0910 (90)
Living area fraction	fLA = Living area / (4) =											0.1654 (91)
MIT	19.3028	19.4421	19.6607	19.9422	20.0696	20.0941	20.0961	20.0960	20.0833	19.8865	19.5397	19.2821 (92)
Temperature adjustment												0.0000
adjusted MIT	19.3028	19.4421	19.6607	19.9422	20.0696	20.0941	20.0961	20.0960	20.0833	19.8865	19.5397	19.2821 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9992	0.9972	0.9854	0.9112	0.6991	0.4484	0.3111	0.3627	0.6774	0.9613	0.9974	0.9995 (94)
Useful gains	1041.8738	1241.4280	1469.5905	1596.7610	1316.2981	847.6472	552.8025	589.5190	1007.9305	1186.3904	1043.2653	998.1525 (95)
Ext temp.	5.0000	5.6000	7.1000	9.7000	12.8000	15.5000	17.1000	16.9000	14.5000	11.2000	7.7000	4.8000 (96)
Heat loss rate W	2687.8853	2596.0682	2360.5076	1909.7882	1355.5065	849.1432	552.8885	589.7756	1031.9899	1616.7256	2203.6027	2700.3922 (97)
Space heating kWh	1224.6326	910.3182	662.8423	225.3796	29.1710	0.0000	0.0000	0.0000	0.0000	320.1694	835.4429	1266.4663 (98a)
Space heating requirement - total per year (kWh/year)												5474.4224
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	1224.6326	910.3182	662.8423	225.3796	29.1710	0.0000	0.0000	0.0000	0.0000	320.1694	835.4429	1266.4663 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5474.4224
Space heating per m2												(98c) / (4) =
												33.3501 (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 %)												249.9000 (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	1224.6326	910.3182	662.8423	225.3796	29.1710	0.0000	0.0000	0.0000	0.0000	320.1694	835.4429	1266.4663 (98)
Space heating efficiency (main heating system 1)												

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Space heating fuel (main heating system)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000	(210)
Space heating efficiency (main heating system 2)	490.0491	364.2730	265.2430	90.1879	11.6731	0.0000	0.0000	0.0000	0.0000	128.1190	334.3109	506.7893	(211)
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	(212)
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	(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 requirement	279.0921	246.8832	262.5201	236.5626	229.9995	203.7841	195.5634	210.9900	211.1236	237.6166	252.5436	278.4282	(64)
Efficiency of water heater (217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	(216)
Fuel for water heating, kWh/month	159.3901	140.9955	149.9258	135.1014	131.3532	116.3816	111.6867	120.4968	120.5731	135.7034	144.2282	159.0110	(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	36.4968	29.2791	26.3626	19.3144	14.9190	12.1889	13.6096	17.6903	22.9779	30.1482	34.0524	37.5112	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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												2190.6452	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												175.1000	
Water heating fuel used												1624.8470	(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)												294.5503	(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												4110.0424	(238)

10a. Fuel costs - using BEDF prices (572)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2190.6452	26.0600	570.8821	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1624.8470	26.0600	423.4351	(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	294.5503	26.0600	76.7598	(250)
Additional standing charges			0.0000	(251)
Total energy cost			1071.0771	(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	2190.6452	0.1569	343.6934	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1624.8470	0.1408	228.8581	(264)
Space and water heating			572.5515	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	294.5503	0.1443	42.5127	(268)
Total CO2, kg/year			615.0642	(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	2190.6452	1.5808	3463.0292	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1624.8470	1.5208	2471.0756	(278)
Space and water heating			5934.1048	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	294.5503	1.5338	451.7910	(282)
Total Primary energy kWh/year			6385.8959	(286)

SAP 10 EPC IMPROVEMENTS

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Church Lane, Middleton

Current energy efficiency rating: C 80
Current environmental impact rating: A 96

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

Recommended measures: SAP change Cost change CO2 change
N Solar water heating + 1.3 -£ 71 -33 kg (5.4%)
U Solar photovoltaic panels + 4.4 -£ 238 -122 kg (21.0%)

Recommended measures Typical annual savings Energy Environmental
Solar water heating £71 0.20 kg/m² B 81 A 96
Solar photovoltaic panels £238 0.75 kg/m² B 86 A 97
Total Savings £309 0.95 kg/m²

Potential energy efficiency rating: B 86
Potential environmental impact rating: A 97

Fuel prices for cost data on this page from database revision number 572 TEST (30 May 2025)
Recommendation texts revision number 6.1 (11 Jun 2019)

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

	Current	Potential	Saving
Electricity	£1071	£1000	£71
Space heating	£571	£592	-£21
Water heating	£423	£331	£92
Lighting	£77	£77	£0
Generated (PV)	-£0	-£238	£238
Total cost of fuels	£1071	£762	£309
Total cost of uses	£1071	£762	£309
Delivered energy	25 kWh/m²	18 kWh/m²	7 kWh/m²
Carbon dioxide emissions	0.6 tonnes	0.5 tonnes	0.2 tonnes
CO2 emissions per m²	4 kg/m²	3 kg/m²	1 kg/m²
Primary energy	39 kWh/m²	28 kWh/m²	11 kWh/m²

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

1. Overall dwelling characteristics

Main dwelling	Area (m²)	Storey height (m)	Volume (m³)
Ground floor	58.1600 (1b)	x 2.4000 (2b)	= 139.5840 (1b) - (3b)
First floor	56.8200 (1c)	x 2.6000 (2c)	= 147.7320 (1c) - (3c)
Second floor	49.1700 (1d)	x 2.9000 (2d)	= 142.5930 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	164.1500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 429.9090 (5)

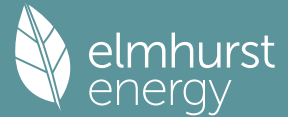
2. Ventilation rate

	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	4 * 10 = 40.0000 (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) = 40.0000 / (5) = 0.0930 (8)
Pressure test
Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered
Shelter factor
Infiltration rate adjusted to include shelter factor

	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	0.4046	0.3966	0.3887	0.3490	0.3411	0.3014	0.3014	0.2935	0.3173	0.3411	0.3570	0.3728 (22b)
Effective ac	0.5818	0.5787	0.5755	0.5609	0.5582	0.5454	0.5454	0.5431	0.5503	0.5582	0.5637	0.5695 (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	
Main dwelling								
Door			2.0000	1.3000	2.6000			(26)
Window			28.0400	1.2357	34.6502			(27)
Roof Light			2.4000	1.2357	2.9658			(27a)
Heatloss Floor 1			58.1600	0.1200	6.9792	110.0000	6397.6000	(28a)
External Wall	233.4600	30.0400	203.4200	0.1800	36.6156	140.0000	28478.8009	(29a)
External Roof	61.4600	2.4000	59.0600	0.1600	9.4496	9.0000	531.5400	(30)
Total net area of external elements Aum(A, m2)			353.0800					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	93.2604			(33)
Main dwelling								
Internal Wall			234.2200			100.0000	23422.0001	(32c)
Internal Floor			56.8200			18.0000	1022.7600	(32d)
Internal Floor			49.1700			18.0000	885.0600	(32d)
Internal Ceiling			56.8200			9.0000	511.3800	(32e)
Internal Ceiling			49.1700			9.0000	442.5300	(32e)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 61691.6711 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 375.8250 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	20.6000	0.0300	0.6180
E3 Sill	19.6500	0.0400	0.7860
E4 Jamb	56.2000	0.0500	2.8100
E5 Ground floor (normal)	32.0100	0.1600	5.1216
E6 Intermediate floor within a dwelling	40.7000	0.0010	0.0407
E16 Corner (normal)	44.6000	0.0900	4.0140
E17 Corner (inverted - internal area greater than external area)	13.0000	-0.0900	-1.1700
E11 Eaves (insulation at rafter level)	13.4000	0.0400	0.5360
E13 Gable (insulation at rafter level)	26.4800	0.0400	1.0592
R1 Head of roof window	3.2000	0.0800	0.2560
R2 Sill of roof window	3.2000	0.0600	0.1920
R3 Jamb of roof window	6.0000	0.0800	0.4800
R4 Ridge (vaulted ceiling)	14.7000	0.0500	0.7350

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 15.4785 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 108.7389 (37)

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

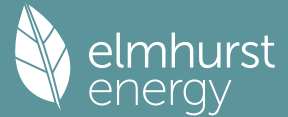
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	82.5458	82.0949	81.6530	79.5772	79.1889	77.3810	77.3810	77.0462	78.0773	79.1889	79.9745	80.7959	(38)
Heat transfer coeff	191.2846	190.8338	190.3918	188.3161	187.9277	186.1198	186.1198	185.7850	186.8162	187.9277	188.7134	189.5348	(39)
Average = Sum(39)m / 12 =													188.3142

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1653	1.1626	1.1599	1.1472	1.1449	1.1338	1.1338	1.1318	1.1381	1.1449	1.1496	1.1546	(40)
HLP (average)													1.1472
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9547 (42)
Hot water usage for mixer showers													
71.8962	70.7955	69.1733	66.6779	64.4420	61.3141	58.8401	61.7323	63.1870	66.2851	69.5115	71.8314	(42a)	
Hot water usage for baths													
31.1325	30.6625	29.9939	28.9927	28.0904	26.8482	25.9058	27.0582	27.6630	28.8938	30.1734	31.1078	(42b)	
Hot water usage for other uses													
44.8887	43.2563	41.6240	39.9917	38.3594	36.7271	36.7271	38.3594	39.9917	41.6240	43.2563	44.8887	(42c)	
Average daily hot water use (litres/day)													135.9578 (43)
Daily hot water use													
147.9174	144.7144	140.7913	135.6623	130.8918	124.8894	121.4730	127.1499	130.8417	136.8029	142.9413	147.8278	(44)	
Energy conte	217.7599	191.4864	201.1879	177.2089	168.6673	144.4304	134.2312	149.6578	151.7698	176.2844	193.1899	217.0960	(45)
Energy content (annual)										Total = Sum(45)m =		2122.9699	
Distribution loss (46)m = 0.15 x (45)m													
32.6640	28.7230	30.1782	26.5813	25.3001	21.6646	20.1347	22.4487	22.7655	26.4427	28.9785	32.5644	(46)	
Water storage loss:													
Store volume													300.0000 (47)
b) If manufacturer declared loss factor is not known :													
Hot water storage loss factor from Table 2 (kWh/litre/day)													0.0103 (51)
Volume factor from Table 2a													0.7368 (52)
Temperature factor from Table 2b													0.5400 (53)
Enter (49) or (54) in (55)													1.2281 (55)
Total storage loss													
38.0698	34.3856	38.0698	36.8417	38.0698	36.8417	38.0698	38.0698	36.8417	38.0698	36.8417	38.0698	(56)	
If cylinder contains dedicated solar storage													
38.0698	34.3856	38.0698	36.8417	38.0698	36.8417	38.0698	38.0698	36.8417	38.0698	36.8417	38.0698	(57)	
Primary loss	23.2624	21.0112	21.8667	15.7584	10.4681	9.9053	10.2355	11.1660	17.1091	21.8667	22.5120	23.2624	(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	(61)	
Total heat required for water heating calculated for each month													
279.0921	246.8832	261.1243	229.8090	217.2052	191.1774	182.5364	198.8935	205.7207	236.2208	252.5436	278.4282	(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)
Aperture area of solar collector													3.0000 (H1)
Zero-loss collector efficiency													0.8000 (H2)
Collector linear heat loss coefficient													1.8000 (H3)
Collector 2nd order heat loss coefficient													0.0000 (H4)
Collector loop efficiency													0.9000 (H5)
Incidence angle modifier													1.0000 (H6)
Overshading factor													0.8000 (H8)
Overall heat loss coefficient of system													6.5000 (H10)
Heat loss coefficient of collector loop													3.9667 (H11)
Dedicated solar storage volume													75.0000 (H12)
Effective solar volume													75.0000 (H14)
Reference volume													225.0000 (H15)
Storage tank correction coefficient													1.3161 (H16)
Heat delivered to hot water													588.7611 (H24)
Heat delivered to space heating													0.0000 (H29)
Solar input													588.7611
Solar input	-0.0000	-10.1072	-52.1087	-77.5145	-103.3439	-93.9480	-91.0332	-81.6722	-54.2051	-24.8284	-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													
279.0921	236.7760	209.0157	152.2945	113.8613	97.2294	91.5033	117.2213	151.5156	211.3925	252.5436	278.4282	(64)	

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Electric shower(s)											Total per year (kWh/year) = Sum(64)m = 2190.8735 (64)
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											Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)
121.4709	107.9867	114.8441	101.0021	94.9122	85.4207	83.2761	89.1498	93.6242	106.5637	111.7186	121.2502 (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	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	41.6966	37.0346	30.1185	22.8017	17.0445	14.3897	15.5486	20.2106	27.1267	34.4435	40.2007	42.8555 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	500.7977	505.9944	492.8989	465.0200	429.8279	396.7524	374.6558	369.4591	382.5547	410.4335	445.6256	478.7012 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826	55.6826 (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)	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863	-118.1863 (71)
Water heating gains (Table 5)	163.2674	160.6945	154.3604	140.2806	127.5701	118.6399	111.9302	119.8250	130.0335	143.2308	155.1648	162.9707 (72)
Total internal gains	820.5375	818.4993	792.1536	742.8781	689.2184	644.5577	616.9104	624.2705	654.4907	702.8837	755.7669	799.3032 (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
North						2.3500	10.6334	0.7000	0.7000	0.7700		8.4853 (74)
East						12.5500	19.6403	0.7000	0.7000	0.7700		83.6990 (76)
South						4.7900	46.7521	0.7000	0.7000	0.7700		76.0441 (78)
West						8.3500	19.6403	0.7000	0.7000	0.7700		55.6882 (80)
North						2.4000	26.0000	0.7000	0.7000	1.0000		27.5184 (82)
Solar gains	251.4351	470.5811	736.8541	1037.2337	1252.2980	1276.9427	1217.5348	1055.9776	842.8308	547.0332	309.3326	209.6346 (83)
Total gains	1071.9726	1289.0804	1529.0077	1780.1119	1941.5164	1921.5005	1834.4452	1680.2482	1497.3215	1249.9168	1065.0995	1008.9377 (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	89.5868	89.7984	90.0069	90.9990	91.1870	92.0728	92.0728	92.2387	91.7296	91.1870	90.8074	90.4139
alpha	6.9725	6.9866	7.0005	7.0666	7.0791	7.1382	7.1382	7.1492	7.1153	7.0791	7.0538	7.0276
util living area	0.9997	0.9987	0.9928	0.9557	0.8256	0.6120	0.4456	0.5066	0.8023	0.9844	0.9990	0.9998 (86)
MIT	20.2131	20.3311	20.5207	20.7537	20.9053	20.9511	20.9559	20.9553	20.9255	20.7022	20.4096	20.1940 (87)
Th 2	19.9479	19.9501	19.9522	19.9625	19.9644	19.9733	19.9733	19.9749	19.9699	19.9644	19.9605	19.9565 (88)
util rest of house	0.9995	0.9980	0.9889	0.9334	0.7605	0.5181	0.3421	0.3950	0.7091	0.9726	0.9983	0.9997 (89)
MIT 2	19.0283	19.1812	19.4242	19.7163	19.8735	19.9153	19.9173	19.9189	19.8981	19.6632	19.2908	19.0110 (90)
Living area fraction	fLA = Living area / (4) = 0.1654 (91)											
MIT	19.2243	19.3714	19.6055	19.8879	20.0442	20.0866	20.0891	20.0903	20.0680	19.8350	19.4759	19.2067 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.2243	19.3714	19.6055	19.8879	20.0442	20.0866	20.0891	20.0903	20.0680	19.8350	19.4759	19.2067 (93)

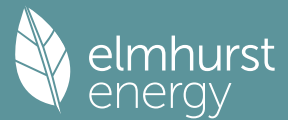
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9993	0.9974	0.9872	0.9314	0.7660	0.5287	0.3539	0.4076	0.7189	0.9705	0.9979	0.9996 (94)
Useful gains	1071.2483	1285.7198	1509.4134	1657.9581	1487.2194	1015.8934	649.1351	684.9361	1076.4853	1213.0718	1062.8167	1008.4905 (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	2854.7886	2761.6354	2495.1890	2069.1945	1568.1051	1021.1739	649.3884	685.6052	1114.9264	1735.5163	2335.4907	2844.2863 (97)
Space heating kWh	1326.9539	991.8153	733.4170	296.0902	60.1789	0.0000	0.0000	0.0000	0.0000	388.6987	916.3253	1365.8321 (98a)
Space heating requirement - total per year (kWh/year)	6079.3115											
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	1326.9539	991.8153	733.4170	296.0902	60.1789	0.0000	0.0000	0.0000	0.0000	388.6987	916.3253	1365.8321 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	6079.3115											
Space heating per m2	(98c) / (4) = 37.0351 (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 %)												249.9000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1326.9539	991.8153	733.4170	296.0902	60.1789	0.0000	0.0000	0.0000	0.0000	388.6987	916.3253	1365.8321 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)												

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530.9940	396.8849	293.4842	118.4835	24.0812	0.0000	0.0000	0.0000	0.0000	155.5417	366.6768	546.5514	(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												
279.0921	236.7760	209.0157	152.2945	113.8613	97.2294	91.5033	117.2213	151.5156	211.3925	252.5436	278.4282	(64)
Efficiency of water heater												
(217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	(216)
Fuel for water heating, kWh/month												
159.3901	135.2233	119.3693	86.9757	65.0264	55.5279	52.2577	66.9453	86.5309	120.7267	144.2282	159.0110	(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	(221)
Pumps and Fa												
6.7945	6.1370	6.7945	6.5753	6.7945	6.5753	6.7945	6.5753	6.7945	6.5753	6.7945	6.7945	(231)
Lighting												
36.4968	29.2791	26.3626	19.3144	14.9190	12.1889	13.6096	17.6903	22.9779	30.1482	34.0524	37.5112	(232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-40.6220	-61.8685	-93.8245	-106.8400	-112.6007	-104.1360	-102.4267	-95.8357	-83.4879	-70.7384	-45.9215	(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	(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	(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	(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	(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	(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	(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	(235d)
Annual totals kWh/year												
Space heating fuel - main system 1											2432.6977	(211)
Space heating fuel - main system 2											0.0000	(213)
Space heating fuel - secondary											0.0000	(215)
Efficiency of water heater											175.1000	(216)
Water heating fuel used											1251.2128	(219)
Space cooling fuel											0.0000	(221)
Electricity for pumps and fans:												
pump for solar water heating											80.0000	(230g)
Total electricity for the above, kWh/year											80.0000	(231)
Electricity for lighting (calculated in Appendix L)											294.5503	(232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation											-952.9200	(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											3105.5407	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2432.6977	16.4900	401.1518	(240)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1251.2128	16.4900	206.3250	(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)
Pump for solar water heating	80.0000	16.4900	13.1920	(249)
Energy for lighting	294.5503	16.4900	48.5713	(250)
Additional standing charges			0.0000	(251)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-952.9200	16.4900	-157.1365	
PV Unit electricity exported	0.0000	5.5900	0.0000	
Total			-157.1365	(252)
Total energy cost			512.1037	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.3600	(256)
Energy cost factor (ECF)		0.8815	(257)
SAP value	$[(255) \times (256)] / [(4) + 45.0] =$	85.7115	
SAP rating (Section 12)		86	(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	2432.6977	0.1565	380.6883	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1251.2128	0.1451	181.5355	(264)
Space and water heating			562.2238	(265)
Pumps, fans and electric keep-hot	80.0000	0.1387	11.0970	(267)
Energy for lighting	294.5503	0.1443	42.5127	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-952.9200	0.1343	-127.9990	
PV Unit electricity exported	0.0000	0.0000	0.0000	
Total			-127.9990	(269)
Total CO2, kg/year			487.8345	(272)
CO2 emissions per m2			2.9700	(273)

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EI value
EI rating
EI band

96.8745
97 (274)
A

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

1. Overall dwelling characteristics

Main dwelling	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	58.1600 (1b)	x 2.4000 (2b)	= 139.5840 (1b) - (3b)
First floor	56.8200 (1c)	x 2.6000 (2c)	= 147.7320 (1c) - (3c)
Second floor	49.1700 (1d)	x 2.9000 (2d)	= 142.5930 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	164.1500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	429.9090 (5)

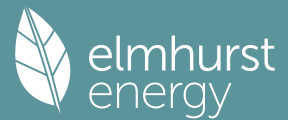
2. Ventilation rate

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	4 * 10 =	40.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.0930 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3430	(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) =	0.3173 (21)
Wind speed	Jan 4.3000 Feb 4.2000 Mar 4.3000 Apr 3.9000 May 3.9000 Jun 3.4000 Jul 3.3000 Aug 3.3000 Sep 3.4000 Oct 3.8000 Nov 3.8000 Dec 3.9000	(22)
Wind factor	1.0750 1.0500 1.0750 0.9750 0.9750 0.8500 0.8250 0.8250 0.8500 0.9500 0.9500 0.9750	(22a)
Adj infilt rate	0.3411 0.3332 0.3411 0.3094 0.3094 0.2697 0.2618 0.2618 0.2697 0.3014 0.3014 0.3094	(22b)
Effective ac	0.5582 0.5555 0.5582 0.5479 0.5479 0.5364 0.5343 0.5343 0.5364 0.5454 0.5454 0.5479	(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
Main dwelling							
Door			2.0000	1.3000	2.6000		(26)
Window			28.0400	1.2357	34.6502		(27)
Roof Light			2.4000	1.2357	2.9658		(27a)
Heatloss Floor 1			58.1600	0.1200	6.9792	110.0000	6397.6000 (28a)
External Wall	233.4600	30.0400	203.4200	0.1800	36.6156	140.0000	28478.8009 (29a)
External Roof	61.4600	2.4000	59.0600	0.1600	9.4496	9.0000	531.5400 (30)
Total net area of external elements Aum(A, m2)			353.0800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		93.2604		(33)
Main dwelling							
Internal Wall			234.2200			100.0000	23422.0001 (32c)
Internal Floor			56.8200			18.0000	1022.7600 (32d)
Internal Floor			49.1700			18.0000	885.0600 (32d)
Internal Ceiling			56.8200			9.0000	511.3800 (32e)
Internal Ceiling			49.1700			9.0000	442.5300 (32e)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		61691.6711 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							375.8250 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E2 Other lintels (including other steel lintels)				20.6000	0.0300	0.6180	
E3 Sill				19.6500	0.0400	0.7860	
E4 Jamb				56.2000	0.0500	2.8100	
E5 Ground floor (normal)				32.0100	0.1600	5.1216	
E6 Intermediate floor within a dwelling				40.7000	0.0010	0.0407	
E16 Corner (normal)				44.6000	0.0900	4.0140	
E17 Corner (inverted - internal area greater than external area)				13.0000	-0.0900	-1.1700	
E11 Eaves (insulation at rafter level)				13.4000	0.0400	0.5360	
E13 Gable (insulation at rafter level)				26.4800	0.0400	1.0592	
R1 Head of roof window				3.2000	0.0800	0.2560	
R2 Sill of roof window				3.2000	0.0600	0.1920	
R3 Jamb of roof window				6.0000	0.0800	0.4800	
R4 Ridge (vaulted ceiling)				14.7000	0.0500	0.7350	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							15.4785 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	108.7389 (37)

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(38)m	79.1889	78.8094	79.1889	77.7247	77.7247	76.0953	75.7962	75.7962	76.0953	77.3810	77.3810	77.7247 (38)
Heat transfer coeff	187.9277	187.5483	187.9277	186.4635	186.4635	184.8342	184.5351	184.5351	184.8342	186.1198	186.1198	186.4635 (39)
Average = Sum(39)m / 12 =												186.1477
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1449	1.1425	1.1449	1.1359	1.1359	1.1260	1.1242	1.1242	1.1260	1.1338	1.1338	1.1359 (40)
HLP (average)												1.1340
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9547 (42)
Hot water usage for mixer showers												
Hot water usage for baths												
Hot water usage for other uses												
Average daily hot water use (litres/day)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	147.9174	144.7144	140.7913	135.6623	130.8918	124.8894	121.4730	127.1499	130.8417	136.8029	142.9413	147.8278 (44)
Energy conte	217.7599	191.4864	201.1879	177.2089	168.6673	144.4304	134.2312	149.6578	151.7698	176.2844	193.1899	217.0960 (45)
Energy content (annual)												
Distribution loss (46)m = 0.15 x (45)m												
Water storage loss:												
Store volume												300.0000 (47)
b) If manufacturer declared loss factor is not known :												
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0103 (51)
Volume factor from Table 2a												0.7368 (52)
Temperature factor from Table 2b												0.5400 (53)
Enter (49) or (54) in (55)												1.2281 (55)
Total storage loss												
If cylinder contains dedicated solar storage												
Primary loss												
Combi loss												
Total heat required for water heating calculated for each month												
WWHRS												
PV diverter												
Aperture area of solar collector												
Zero-loss collector efficiency												
Collector linear heat loss coefficient												
Collector 2nd order heat loss coefficient												
Collector loop efficiency												
Incidence angle modifier												
Overshading factor												
Overall heat loss coefficient of system												
Heat loss coefficient of collector loop												
Dedicated solar storage volume												
Effective solar volume												
Reference volume												
Storage tank correction coefficient												
Heat delivered to hot water												
Heat delivered to space heating												
Solar input												
Solar input	-0.0000	-5.6967	-47.8119	-74.6979	-97.4290	-90.9152	-84.9735	-75.1633	-52.9457	-23.2229	-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	279.0921	241.1865	213.3124	155.1111	119.7762	100.2622	97.5630	123.7302	152.7750	212.9979	252.5436	278.4282 (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												
	121.4709	107.9867	114.8441	101.0021	94.9122	85.4207	83.2761	89.1498	93.6242	106.5637	111.7186	121.2502 (65)

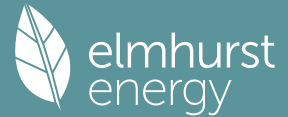
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
(66)m	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795	177.2795 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
Pumps, fans												
Losses e.g. evaporation (negative values) (Table 5)												
Water heating gains (Table 5)												
Total internal gains	820.5375	818.4993	792.1536	742.8781	689.2184	644.5577	616.9104	624.2705	654.4907	702.8837	755.7669	799.3032 (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
North	2.3500	9.3942	0.7000	0.7000	0.7700	7.4965 (74)
East	12.5500	17.3606	0.7000	0.7700	0.7700	73.9839 (76)
South	4.7900	41.2355	0.7000	0.7000	0.7700	67.0713 (78)
West	8.3500	17.3606	0.7000	0.7000	0.7700	49.2244 (80)

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North	2.4000		23.0000		0.7000		0.7000		1.0000		24.3432 (82)	
Solar gains	222.1192	426.4719	697.7525	1001.9008	1179.9115	1231.6968	1146.1120	988.0639	827.4063	529.8289	290.1958	199.3744 (83)
Total gains	1042.6567	1244.9712	1489.9061	1744.7789	1869.1299	1876.2546	1763.0224	1612.3344	1481.8970	1232.7126	1045.9626	998.6776 (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	91.1870	91.3715	91.1870	91.9031	91.9031	92.7132	92.8635	92.8635	92.7132	92.0728	92.0728	91.9031
alpha	7.0791	7.0914	7.0791	7.1269	7.1269	7.1809	7.1909	7.1909	7.1809	7.1382	7.1382	7.1269
util living area	0.9996	0.9985	0.9918	0.9428	0.7738	0.5388	0.4078	0.4682	0.7693	0.9794	0.9988	0.9997 (86)
MIT	20.2673	20.3792	20.5583	20.7942	20.9274	20.9547	20.9565	20.9561	20.9351	20.7399	20.4541	20.2465 (87)
Th 2	19.9644	19.9662	19.9644	19.9716	19.9716	19.9796	19.9811	19.9811	19.9796	19.9733	19.9733	19.9716 (88)
util rest of house	0.9994	0.9977	0.9873	0.9138	0.6954	0.4406	0.3015	0.3525	0.6687	0.9633	0.9979	0.9996 (89)
MIT 2	19.1116	19.2564	19.4821	19.7710	19.8987	19.9235	19.9256	19.9255	19.9142	19.7167	19.3585	19.0910 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.3028	19.4421	19.6601	19.9403	20.0689	20.0940	20.0961	20.0960	20.0831	19.8860	19.5397	19.2821 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.3028	19.4421	19.6601	19.9403	20.0689	20.0940	20.0961	20.0960	20.0831	19.8860	19.5397	19.2821 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9992	0.9972	0.9854	0.9127	0.7034	0.4517	0.3136	0.3656	0.6798	0.9615	0.9974	0.9995 (94)
Useful gains	1041.8738	1241.4280	1468.2277	1592.4701	1314.6856	847.5677	552.7972	589.5034	1007.3669	1185.2196	1043.2653	998.1525 (95)
Ext temp.	5.0000	5.6000	7.1000	9.7000	12.8000	15.5000	17.1000	16.9000	14.5000	11.2000	7.7000	4.8000 (96)
Heat loss rate W	2687.8853	2596.0682	2360.3952	1909.4380	1355.3785	849.1362	552.8879	589.7739	1031.9447	1616.6296	2203.6027	2700.3922 (97)
Space heating kWh	1224.6326	910.3182	663.7726	228.2169	30.2755	0.0000	0.0000	0.0000	0.0000	320.9690	835.4429	1266.4663 (98a)
Space heating requirement - total per year (kWh/year)	5480.0941											
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	1224.6326	910.3182	663.7726	228.2169	30.2755	0.0000	0.0000	0.0000	0.0000	320.9690	835.4429	1266.4663 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	5480.0941											
Space heating per m2	(98c) / (4) = 33.3847 (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 %)												249.9000 (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	1224.6326	910.3182	663.7726	228.2169	30.2755	0.0000	0.0000	0.0000	0.0000	320.9690	835.4429	1266.4663 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)	490.0491	364.2730	265.6153	91.3233	12.1150	0.0000	0.0000	0.0000	0.0000	128.4390	334.3109	506.7893 (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	279.0921	241.1865	213.3124	155.1111	119.7762	100.2622	97.5630	123.7302	152.7750	212.9979	252.5436	278.4282 (64)
Efficiency of water heater (217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)
Fuel for water heating, kWh/month	159.3901	137.7422	121.8232	88.5843	68.4045	57.2600	55.7184	70.6626	87.2502	121.6436	144.2282	159.0110 (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	6.7945	6.1370	6.7945	6.5753	6.7945	6.5753	6.7945	6.7945	6.5753	6.7945	6.5753	6.7945 (231)
Lighting	36.4968	29.2791	26.3626	19.3144	14.9190	12.1889	13.6096	17.6903	22.9779	30.1482	34.0524	37.5112 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-36.2084	-56.6178	-89.2776	-102.8838	-107.6928	-102.1064	-99.1630	-92.2129	-82.4829	-68.3603	-43.2258	-32.9645 (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	2192.9148 (211)											
Space heating fuel - main system 2	0.0000 (213)											
Space heating fuel - secondary	0.0000 (215)											
Efficiency of water heater	175.1000											
Water heating fuel used	1271.7182 (219)											
Space cooling fuel	0.0000 (221)											

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Electricity for pumps and fans:	
pump for solar water heating	80.0000 (230g)
Total electricity for the above, kWh/year	80.0000 (231)
Electricity for lighting (calculated in Appendix L)	294.5503 (232)

Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-913.1964 (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	2925.9868 (238)

10a. Fuel costs - using BEDF prices (572)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2192.9148	26.0600	571.4736 (240)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1271.7182	26.0600	331.4098 (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)
Pump for solar water heating	80.0000	26.0600	20.8480 (249)
Energy for lighting	294.5503	26.0600	76.7598 (250)
Additional standing charges			0.0000 (251)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-913.1964	26.0600	-237.9790
PV Unit electricity exported	0.0000	5.8100	0.0000
Total			-237.9790 (252)
Total energy cost			762.5122 (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	2192.9148	0.1569	344.0145 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1271.7182	0.1449	184.2107 (264)
Space and water heating			528.2252 (265)
Pumps, fans and electric keep-hot	80.0000	0.1387	11.0970 (267)
Energy for lighting	294.5503	0.1443	42.5127 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-913.1964	0.1340	-122.3961
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-122.3961 (269)
Total CO2, kg/year			459.4388 (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	2192.9148	1.5808	3466.4885 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1271.7182	1.5358	1953.0959 (278)
Space and water heating			5419.5844 (279)
Pumps, fans and electric keep-hot	80.0000	1.5128	121.0240 (281)
Energy for lighting	294.5503	1.5338	451.7910 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-913.1964	1.4953	-1365.5414
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-1365.5414 (283)
Total Primary energy kWh/year			4626.8580 (286)