

Energy Statement

168 Yorkshire Street

Job number: 13924

Date: July 2026

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1 Executive Summary

This report has been produced by Base Energy on behalf of Identity Interior Design Partnerships and in support of the planning application for the development named as 168 Yorkshire Street, Rochdale, OL16 2DL comprising the conversion of an existing office building into 21 flats falling under the requirements of Greater Manchester Authority.

It sets out the design approach with regards to energy, carbon dioxide emissions, and sustainability in order to ensure the development complies with:

- National Planning Policy
- The Greater Manchester Combined Authority
- Places for everyone joint development plan, JP-S2 Carbon and Energy

The above policies require:

- Be Net Zero Carbon where feasible
- As an interim measure, development should be consistent with 2022 Part L building regulations (this would be Part L 2021)

The design of the development will incorporate energy efficient building fabric and services:

- Thermal specification meeting and exceeding Part L 2021 limiting U-values
- A design which limits air permeability, targeting 5.0
- A design which limits thermal bridging where feasible
- Energy saving building services including low energy lighting and heating controls

This results in an overall 27% carbon emissions reduction over Part L 2021.

2 Existing and Proposed Development

The development site is located at 168 Yorkshire Street, Rochdale, OL16 2DL.

The development proposals are for the conversion of an existing office building into 21 flats over three storeys.

The development proposals constitute a major development.

Aspects of the site location, shape, and surroundings (in particular the adjacent buildings), along with any other requirements of planning, use type, and scale will naturally constrain the development proposals in terms of the layout, positioning, and orientation of the proposed development. Subsequently, these constraints will impact on the feasibility of certain renewable technologies (as discussed in Section 4 of this report).

Figure 2.1: Site location and proposals



3 Planning Policy

National Planning Policy Framework 2024

The NPPF was updated in December 2024 to place greater emphasis on beauty, place-making, the environment, and sustainable development. The strengthened environmental objectives aim to protect and enhance the natural, built, and historic environment, and encourage effective land use, greater biodiversity, prudent use of natural resources, minimisation of waste and pollution, and adaptation to climate change alongside a move to a low carbon economy.

The Greater Manchester Combined Authority

The relevant Local Planning Policy requirements are as follows.

- Places for everyone joint development plan, JP-S2 Carbon and Energy

The development should target:

1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;
2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured;
3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;
4. Increasing the range of nature-based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques;

As this development does not comprise a new building, section 5 will not be targeted.

Based on the above the property is aiming to meet a saving in CO2 and energy over Part L 2021 building regulations.

4 Methodology

The Standard Assessment Procedure (SAP) is the UK Government methodology for assessing and calculating the energy performance of dwellings.

The Simplified Building Energy Model (SBEM) is the UK Government methodology for assessing and calculating the energy performance of non-domestic buildings.

SAP and SBEM calculations take into account a range of factors that contribute to energy efficiency, including:

- Materials used for the construction and the thermal insulation of the building fabric (u-values¹ and thermal mass)
- Air permeability
- Efficiency, fuel source, and control of heating and cooling systems
- Ventilation system energy use and heat recovery
- Lighting energy
- Low carbon and energy saving or generating technologies

Approved Document Part L of current Building Regulations addresses the conservation of fuel and power. Part L is divided into two separate documents:

- Part L1 Newly constructed and extended or renovated existing dwellings
- Part L2 Newly constructed and extended or renovated existing non-domestic buildings

To comply with Part L, the calculations should demonstrate how the building will either meet or achieve a percentage reduction in the Building Emission Rate (BER) under the required Target Emission Rate (TER).

The calculation software has been used to calculate a baseline of energy demand and carbon dioxide emissions as appropriate from which any reductions or contributions have been measured.

¹ U-values (Thermal Transmittance) - the measure of the overall rate of heat transfer by all mechanisms under standard conditions, through a particular section of a construction. Lower u-values mean better thermal insulation

5 Baseline Energy & CO₂

Energy modelling software has been used to calculate a baseline for the development. This forms the basis from which compliance with planning policy has been measured.

Table 5.1: Baseline CO₂

	CO ₂ Emission Rate (kg CO ₂ /m ² /year)	Floor Area (m ²)	Total Baseline Emissions (kg CO ₂ /year)
Baseline	18.3	937	17,147

The **Total Baseline CO₂ Emissions** for the development are shown to be 17,147 kg/year.

Table 5.2: Baseline Energy Demand

	Energy Demand (kWh/m ² /year)	Floor Area (m ²)	Total Baseline Energy Demand (kWh/year)
Baseline	190.84	937	178,817

The **Baseline Energy Demand** for the development is shown to be 178,817 kWh per year.

6 Low Carbon Design – Fabric First – Be Lean

Before considering low carbon energy generating technology the development has been designed to reduce energy demand through the first step of the energy hierarchy by considering 'fabric first'. A thermally efficient building envelope will follow the design standards as set out below.

Table 6.0: Building Fabric Standards (including u-values W/m²K)

	Part L 2021 Limiting Targets	Proposed Development
Existing cavity walls	0.55	0.43
Existing floor	0.25	0.23
Existing roof	0.16	0.15
New windows	1.4	1.4
Entrance doors	1.4	1.4
Air permeability	NA	5.0

- Insulation: The specified building envelope is designed to meet and exceed the limiting Part L targets and will help to limit the energy demand of the dwelling for space heating
- Thermal bridging: The design will seek to limit heat loss through thermal bridging

Once heat retention has been addressed the next step is to ensure energy consuming building services are efficient.

- Lighting: Low energy LED lighting throughout with a minimum efficacy of 80 lumens per watt
- Space & Water Heating: Direct acting electric combi boiler per dwelling
- Heating Controls: Programmer and room thermostat
- Ventilation: Natural ventilation with localised extract fans
- Shower flow rate: 9 L/min

8 Low Carbon Technology Review & Recommendations

Having set out an energy efficient design, the next step is to incorporate low carbon technology for energy generation. A number of technologies exist and should be specified where they:

- Comply with planning policy
- Are feasible for the site
- Are cost efficient
- Are appropriate for proposed development form and function
- Protect against fuel poverty
- Promote fuel security
- Reduce reliance on fossil fuels
- Reduce carbon emissions
- Reduce resource depletion
- Reduce pollution

Site location and development form and function will influence the suitability of different technologies through:

- Orientation
- Space (inside and outside of the buildings)
- Surrounding topography, structures, and natural features
- Wind speed
- Overshading
- Geology and ground conditions
- Building form, function, and density

In determining the most feasible renewable technologies for the dwelling, the following have been reviewed:

- Wind turbines
- Ground Source Heat Pumps
- Air Source Heat Pumps
- Biomass
- Combined Heat and Power
- Photovoltaic Panels
- Solar water heating

WIND TURBINES

Wind turbines are used to produce electricity. They can be either pole mounted (in a suitably exposed position) or building mounted; building mounted systems need a sufficient wind speed at the structural height and both a structural survey and planning permission.

- Wind speed can be too low on low rise buildings
- Taller systems need sufficient space
- Wind resources very variable and unpredictable
- May need planning permission

Wind turbines technology is **not recommended** for this development

GROUND SOURCE HEAT PUMP (GSHP)

GSHPs use naturally occurring underground low-level heat in areas with appropriate geological features. Heat is transferred from the ground by either extracting and discharging (re-charging) water from/to the ground directly (open loop) or circulating water through pipes buried within the ground, (closed loop). The water is passed through a heat pump to transfer the heat from this water into a higher temperature water circuit to provide heating. The loop can be fitted horizontally (laid in a shallow trench) or vertically (in a borehole).

- Feasibility analysis is costly
- Suitable ground conditions required
- More capital intensive than air source heat pumps
- Can be more efficient and lower running costs than ASHPs
- Well suited to highly insulated buildings

Ground source heat pump technology is **not recommended** for this development

AIR SOURCE HEAT PUMP (ASHP)

ASHP systems absorb heat from outside air at a low temperature into a fluid which is then passed through an electrically driven compressor where its temperature is increased. There are two main types of ASHP systems: Air to Water systems distribute heat through wet central heating; Air to air produce warm air which is circulated by fans. For an ASHP system to be installed, there needs to be ample outdoor space for the external condensing unit; these units can also be noisy and blow out colder air to the neighbouring environment.

- Requires space for external plant and internal hot water tank for wet systems supplying DHW
- Can generate noise though quieter systems have been developed
- Least efficient when most needed
- Longer life than fossil fuel boilers
- High capital costs vs gas systems but lower than GSHPs
- Well suited to highly insulated buildings

Air source heat pump technology **is recommended** for this development

BIOMASS

Biomass systems burn wood pellets, chips, or logs to provide heat in a single room, or to power central heating and hot water boilers. There needs to be ample space available for both the boiler and the storage of fuel. There will also be regular deliveries of fuel and therefore adequate site access is required.

- Carbon emissions are cyclical unlike fossil fuel
- Requires fuel storage space and bulk delivery
- Carbon 'neutral' fuel in isolation but supply side emissions are still present so not neutral overall
- Harmful particulate emissions impact air quality and health

Biomass technology **is not recommended** for this development

COMBINED HEAT AND POWER (CHP)

CHP is effectively an on-site small power plant providing both electrical power and thermal heat energy. It is an energy efficiency and low carbon measure rather than a renewable energy technology. A CHP system operates by burning a primary fuel (normally natural gas) by use of either a reciprocating engine or turbine, which in turn drives an alternator to generate electrical power. The heat emitted by the engine and exhaust gases is recovered and used to heat the building or to provide hot water.

- Reduces consumption of and reliance on grid electricity
- Works best with high and consistent heat and hot water demand
- Recovers waste energy
- Can export to the grid
- Uses fossil fuel
- Emissions on site rather than upstream
- Efficiency is sensitive to sizing

CHP **is not recommended** for this development

DISTRICT HEATING

District Heating systems provide multiple buildings or dwellings with heat and hot water from a central boiler house, or 'energy centre'. The system can provide heating or cooling which is transferred from the energy centre through a network of highly insulated pipes carrying the heated water to each dwelling.

- Economies of scale
- Frees up space in habitable areas of development
- Variety of systems
- Can make use of waste heat from industry
- Can be fossil fuel based and dependent

With reference to the Local Heat Map it has been determined that there are proposed heat networks or energy centres within a suitable radius from the development, however there are no existing networks local to the site.

District heating can be considered in the future and has been detailed on Section 7, page 9 of this report.

SOLAR PHOTOVOLTAIC (PV)

Solar PV cells (which are mounted together in panels or tiles on the roof) convert sunlight into electricity. The cells are made from layers of semi-conducting material; when the light shines on the cell, an electric field is created across the layers. Although PV cells are most effective in bright sunlight, they can still generate electricity on a cloudy day. The power of a PV cell is measured in kilowatts peak (kWp). Each PV panel produces 250 Watts to 420 Watts depending on the manufacture.

- Passive technology, requires no energy input from grid
- Does not require sunny days to generate power
- Capital costs can be high although payback is effective
- Needs sufficient roof space and orientation
- Zero site or upstream emissions
- Can export to the grid

Solar PV technology **is recommended** for this development

SOLAR HOT WATER

Solar hot water systems absorb energy from the sun and transfer this energy using heat exchangers to heat water which can then be stored. Systems should be roof mounted and oriented to face between a south-east and south-west direction.

- Mostly passive technology but requires pump energy
- Not suitable for combi boilers and developments without roof space
- Lower CO₂ reductions than other technologies

Solar hot water technology **is not recommended** for this development

Low and Zero Carbon Technology Summary

No low or zero carbon technology is being proposed.

9 Be Lean Results

The Be lean fabric and services measures have been incorporated into the calculation, and the results are set out below.

Table 8.1: Baseline vs Be Lean CO₂

	CO ₂ Emission Rate (kg CO ₂ /m ² /year)	Floor Area (m ²)	Total Baseline Emissions (kg CO ₂ /year)	Reduction in CO ₂
Baseline	18.3	937	17,147	N/A
Be Lean Design	13.3	937	12,462	27%

The **CO₂ Emissions reduction** as a result of energy efficient fabric and services is shown to be 4,685 kg/year which equals a 27% reduction.

No Be Green results have been calculated.

10 Conclusion

Proposals are for the development named as 168 Yorkshire Street, Rochdale, OL16 2DL comprising the conversion of an existing office building into 21 flats falling under the requirements of the Greater Manchester combined authority.

Under the local planning policy, the proposed development is required to achieve a saving in CO₂ via renewable energy over Part L 2021 building regulations.

Energy modelling software has been used to calculate a baseline against which compliance with the above can be measured.

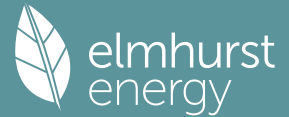
The proposed development will be designed to limit energy demand through the inclusion of a thermally efficient building fabric and energy efficient services.

No low carbon or renewable technology is being proposed.

This results in a 27% saving in CO₂ emissions over Part L 2021 regulations via Be Lean measures.

11 Appendix 1 DER/TER SAP Worksheets

Full SAP Calculation Printout



Plot Reference	13924 1			Issued on Date	16/07/2026
Assessment Reference	001	Plot Type Ref	Flat 1		
Plot Address	St James Place, 168, Yorkshire Street, Rochdale, OL16 2DL			SAP Version	10.2
SAP Rating	41 E	DER	15.41	TER	
Environmental	87 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.16	DFEE	78.11	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	159.21	TPER	
Assessor Details	Mr. Peter Kinsella			Assessor ID	L770-0002
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 (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		207.2000 (1b) - (3b)
Dwelling volume			207.2000 (4)
			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 207.2000 (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	2 * 10 = 20.0000 (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) =	20.0000 / (5) = 0.0965 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3465 (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) = 0.3205 (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	0.4087	0.4007	0.3927	0.3526	0.3446	0.3045	0.3045	0.2965	0.3205	0.3446	0.3606	0.3766 (22b)
Effective ac	0.5835	0.5803	0.5771	0.5622	0.5594	0.5464	0.5464	0.5440	0.5514	0.5594	0.5650	0.5709 (25)

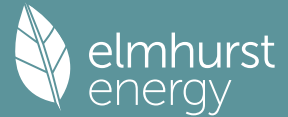
3. Heat losses and heat loss parameter

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			2.2000	1.4000	3.0800		(26)
New Windows			8.1000	1.3258	10.7386		(27)
Heat Loss Floor 1			74.0000	0.2300	17.0200	110.0000	8140.0000 (28a)
Existing Cavity	68.1800	10.3000	57.8800	0.4300	24.8884	150.0000	8682.0000 (29a)
Wall to Bin Store	14.8700		14.8700	0.4300	6.3941	150.0000	2230.5000 (29a)
Total net area of external elements Aum(A, m ²)			157.0500				(31)
Fabric heat loss, W/K = Sum (A x U)					62.1211		(33)
Main dwelling							
CW			20.5500	0.0000	0.0000	70.0000	1438.5000 (32)
Party Ceilings 1			74.0000			30.0000	2220.0000 (32b)
Internal Wall 1			105.0000			9.0000	945.0000 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 23656.0000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							319.6757 (35)
Thermal bridges (Default value 0.200 * total exposed area)							31.4100 (36)
Point Thermal bridges							(36a) = 0.0000
Total fabric heat loss							(33) + (36) + (36a) = 93.5311 (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
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Full SAP Calculation Printout



(38)m	39.8981	39.6764	39.4591	38.4382	38.2472	37.3581	37.3581	37.1935	37.7006	38.2472	38.6336	39.0376 (38)
Heat transfer coeff	133.4293	133.2075	132.9902	131.9694	131.7784	130.8892	130.8892	130.7246	131.2317	131.7784	132.1647	132.5687 (39)
Average = Sum(39)m / 12 =												131.9684
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.8031	1.8001	1.7972	1.7834	1.7808	1.7688	1.7688	1.7665	1.7734	1.7808	1.7860	1.7915 (40)
HLP (average)												1.7834
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3392 (42)
Hot water usage for mixer showers													
91.6624	90.2849	88.2776	84.4370	81.6027	78.4419	76.6454	78.6375	80.8212	84.2149	88.1380	91.3112	(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													
38.5857	37.1826	35.7795	34.3763	32.9732	31.5701	31.5701	32.9732	34.3763	35.7795	37.1826	38.5857	(42c)	
Average daily hot water use (litres/day)												119.5875 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	130.2481	127.4674	124.0570	118.8133	114.5759	110.0120	108.2155	111.6107	115.1975	119.9943	125.3205	129.8969 (44)	
Energy conte	206.2811	181.5119	190.6710	162.6495	154.2412	135.2726	130.8772	138.1974	142.0501	162.8312	178.5421	203.3871 (45)	
Energy content (annual)										Total = Sum(45)m =		1986.5123	
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 (or HIU 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	(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													
175.3389	154.2851	162.0704	138.2520	131.1050	114.9817	111.2457	117.4678	120.7426	138.4065	151.7608	172.8790	(62)	
WWHRS	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	(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	(63c)	
FGHRS	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													
175.3389	154.2851	162.0704	138.2520	131.1050	114.9817	111.2457	117.4678	120.7426	138.4065	151.7608	172.8790	(64)	
12Total per year (kWh/year)									Total per year (kWh/year) = Sum(64)m =			1688.5355 (64)	
Electric shower(s)												1689 (64)	
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													
43.8347	38.5713	40.5176	34.5630	32.7763	28.7454	27.8114	29.3669	30.1856	34.6016	37.9402	43.2198	(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	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	117.9370	130.5731	117.9370	121.8682	117.9370	121.8682	117.9370	117.9370	121.8682	117.9370	121.8682	117.9370 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678 (71)
Water heating gains (Table 5)	58.9176	57.3977	54.4591	48.0042	44.0541	39.9242	37.3809	39.4717	41.9245	46.5076	52.6947	58.0911 (72)
Total internal gains	444.3898	457.6483	436.6751	422.6587	400.2699	383.4363	367.8528	367.8013	379.5838	394.7283	419.3541	434.4542 (73)

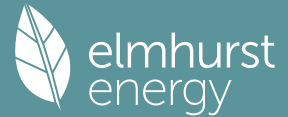
6. Solar gains

[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	
Southeast			4.8600		36.7938		0.6300		0.7000		0.7700	54.6491 (77)
Northwest			3.2400		11.2829		0.6300		0.7000		0.7700	11.1722 (81)
Solar gains	65.8213	115.8290	168.3393	225.1023	267.2137	271.9147	259.3943	226.9632	187.8370	130.6734	79.5146	55.8920 (83)
Total gains	510.2111	573.4773	605.0144	647.7610	667.4836	655.3510	627.2470	594.7644	567.4207	525.4017	498.8687	490.3463 (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	49.2479	49.3299	49.4105	49.7927	49.8649	50.2036	50.2036	50.2668	50.0726	49.8649	49.7191	49.5676
alpha	4.2832	4.2887	4.2940	4.3195	4.3243	4.3469	4.3469	4.3511	4.3382	4.3243	4.3146	4.3045
util living area												
	0.9986	0.9974	0.9953	0.9878	0.9658	0.8975	0.7767	0.8176	0.9464	0.9902	0.9974	0.9988 (86)
MIT	19.1409	19.2983	19.5644	19.9622	20.3698	20.7289	20.9036	20.8749	20.5998	20.0775	19.5477	19.1178 (87)
Th 2	19.4678	19.4699	19.4720	19.4817	19.4835	19.4919	19.4919	19.4935	19.4887	19.4835	19.4798	19.4760 (88)
util rest of house												
	0.9980	0.9962	0.9928	0.9802	0.9394	0.8034	0.5749	0.6334	0.8900	0.9825	0.9959	0.9983 (89)
MIT 2	17.8295	17.9880	18.2547	18.6558	19.0509	19.3683	19.4725	19.4634	19.2691	18.7735	18.2446	17.8124 (90)

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Living area fraction										fLA = Living area / (4) =		0.3243 (91)
MIT	18.2548	18.4130	18.6795	19.0795	19.4787	19.8096	19.9366	19.9212	19.7007	19.1964	18.6672	18.2358 (92)
Temperature adjustment												0.0000
adjusted MIT	18.2548	18.4130	18.6795	19.0795	19.4787	19.8096	19.9366	19.9212	19.7007	19.1964	18.6672	18.2358 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9972	0.9949	0.9908	0.9774	0.9392	0.8287	0.6450	0.6971	0.9009	0.9803	0.9946	0.9976	(94)
Useful gains	508.7623	570.5766	599.4610	633.0956	626.9270	543.1144	404.5953	414.5838	511.1896	515.0682	496.1826	489.1849	(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	1861.9843	1800.0294	1619.7477	1343.3795	1025.0585	681.8757	436.7278	460.3083	734.9905	1132.8204	1528.7777	1860.7044	(97)
Space heating kWh	1006.7972	826.1923	759.0933	511.4044	296.2099	0.0000	0.0000	0.0000	0.0000	459.6076	743.4685	1020.4105	(98a)
Space heating requirement - total per year (kWh/year)												5623.1836	
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	1006.7972	826.1923	759.0933	511.4044	296.2099	0.0000	0.0000	0.0000	0.0000	459.6076	743.4685	1020.4105	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5623.1836	
Space heating per m2										(98c) / (4) =		75.9890	(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	1006.7972	826.1923	759.0933	511.4044	296.2099	0.0000	0.0000	0.0000	0.0000	459.6076	743.4685	1020.4105	(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)	1006.7972	826.1923	759.0933	511.4044	296.2099	0.0000	0.0000	0.0000	0.0000	459.6076	743.4685	1020.4105	(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	175.3389	154.2851	162.0704	138.2520	131.1050	114.9817	111.2457	117.4678	120.7426	138.4065	151.7608	172.8790	(64)
Efficiency of water heater	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	175.3389	154.2851	162.0704	138.2520	131.1050	114.9817	111.2457	117.4678	120.7426	138.4065	151.7608	172.8790	(217)
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	3.4822	3.1452	3.4822	3.3699	3.4822	3.3699	3.4822	3.4822	3.3699	3.4822	3.3699	3.4822	(231)
Lighting	25.7328	20.6438	18.5875	13.6180	10.5189	8.5940	9.5957	12.4729	16.2010	21.2566	24.0093	26.4480	(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												5623.1836	(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												1688.5355	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												41.0000	(230c)
Total electricity for the above, kWh/year												41.0000	(231)
Electricity for lighting (calculated in Appendix L)												207.6786	(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												7560.3977	(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	5623.1836	0.1540	865.7678	(261)
Total CO2 associated with community systems			0.0000	(373)

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Water heating (other fuel)	1688.5355	0.1416	239.0900 (264)
Space and water heating			1104.8578 (265)
Pumps, fans and electric keep-hot	41.0000	0.1387	5.6872 (267)
Energy for lighting	207.6786	0.1443	29.9744 (268)
Total CO ₂ , kg/year			1140.5195 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			15.4100 (273)

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

	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year
Space heating - main system 1	5623.1836	1.5700	8828.4967 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	1688.5355	1.5236	2572.6618 (278)
Space and water heating			11401.1585 (279)
Pumps, fans and electric keep-hot	41.0000	1.5128	62.0248 (281)
Energy for lighting	207.6786	1.5338	318.5444 (282)
Total Primary energy kWh/year			11781.7277 (286)
Dwelling Primary energy Rate (DPER)			159.2100 (287)

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Plot Reference	13924 1			Issued on Date	16/07/2026
Assessment Reference	Notional	Plot Type Ref	Flat 1		
Plot Address	St James Place, 168, Yorkshire Street, Rochdale, OL16 2DL			SAP Version	10.2
SAP Rating	26 F	DER	20.33	TER	
Environmental	83 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	1.49	DFEE	103.14	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	210.58	TPER	
Assessor Details	Mr. Peter Kinsella			Assessor ID	L770-0002
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 (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		207.2000
Dwelling volume			207.2000

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	2 * 10 = 20.0000 (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) =	20.0000 / (5) = 0.0965 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.8465 (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) = 0.7830 (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)
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	0.9984	0.9788	0.9592	0.8613	0.8418	0.7439	0.7439	0.7243	0.7830	0.8418	0.8809	0.9201 (22b)
Effective ac	0.9984	0.9790	0.9601	0.8710	0.8543	0.7767	0.7767	0.7623	0.8066	0.8543	0.8880	0.9233 (25)

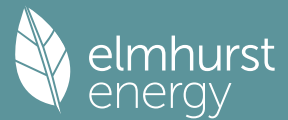
3. Heat losses and heat loss parameter

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			2.2000	1.4000	3.0800		(26)
New Windows			8.1000	1.3258	10.7386		(27)
Heat Loss Floor 1			74.0000	0.2500	18.5000	110.0000	8140.0000 (28a)
Existing Cavity	68.1800	10.3000	57.8800	0.5500	31.8340	150.0000	8682.0000 (29a)
Wall to Bin Store	14.8700		14.8700	0.5500	8.1785	150.0000	2230.5000 (29a)
Total net area of external elements Aum(A, m ²)			157.0500				(31)
Fabric heat loss, W/K = Sum (A x U)					72.3311		(33)
Main dwelling							
CW			20.5500	0.0000	0.0000	70.0000	1438.5000 (32)
Party Ceilings 1			74.0000			30.0000	2220.0000 (32b)
Internal Wall 1			105.0000			9.0000	945.0000 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 23656.0000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							319.6757 (35)
Thermal bridges (Default value 0.200 * total exposed area)							31.4100 (36)
Point Thermal bridges							(36a) = 0.0000
Total fabric heat loss							(33) + (36) + (36a) = 103.7411 (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
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(38)m 68.2647 66.9414 65.6444 59.5523 58.4124 53.1064 53.1064 52.1238 55.1502 58.4124 60.7183 63.1289 (38)
 Heat transfer coeff 172.0058 170.6826 169.3855 163.2934 162.1536 156.8475 156.8475 155.8649 158.8913 162.1536 164.4594 166.8701 (39)
 Average = Sum(39)m / 12 = 163.2879

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.3244	2.3065	2.2890	2.2067	2.1913	2.1196	2.1196	2.1063	2.1472	2.1913	2.2224	2.2550	(40)
HLP (average)												2.2066	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.3392 (42)
 Hot water usage for mixer showers 112.0318 110.3482 107.8948 103.2007 99.7366 95.8735 93.6777 96.1125 98.7815 102.9293 107.7242 111.6025 (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 38.5857 37.1826 35.7795 34.3763 32.9732 31.5701 31.5701 32.9732 34.3763 35.7795 37.1826 38.5857 (42c)
 Average daily hot water use (litres/day) 138.3674 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	150.6175	147.5307	143.6742	137.5771	132.7098	127.4436	125.2478	129.0857	133.1578	138.7087	144.9068	150.1882	(44)
Energy conte	238.5412	210.0818	220.8220	188.3361	178.6530	156.7068	151.4763	159.8350	164.1969	188.2265	206.4462	235.1585	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m	35.7812	31.5123	33.1233	28.2504	26.7979	23.5060	22.7215	23.9753	24.6295	28.2340	30.9669	35.2738	(46)
Water storage loss (or HIU loss):													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8900 (48)
Temperature factor from Table 2b													0.6000 (49)
Enter (49) or (54) in (55)													1.1340 (55)
Total storage loss	35.1540	31.7520	35.1540	34.0200	35.1540	34.0200	35.1540	35.1540	34.0200	35.1540	34.0200	35.1540	(56)
If cylinder contains dedicated solar storage	35.1540	31.7520	35.1540	34.0200	35.1540	34.0200	35.1540	35.1540	34.0200	35.1540	34.0200	35.1540	(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	273.6952	241.8338	255.9760	222.3561	213.8070	190.7268	186.6303	194.9890	198.2169	223.3805	240.4662	270.3125	(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	273.6952	241.8338	255.9760	222.3561	213.8070	190.7268	186.6303	194.9890	198.2169	223.3805	240.4662	270.3125	(64)
Total per year (kWh/year)													2712.3903 (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	107.4382	95.2538	101.5465	89.8378	87.5253	79.3210	78.4891	81.2684	81.8115	90.7085	95.8594	106.3134	(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	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	117.9370	130.5731	117.9370	121.8682	117.9370	121.8682	117.9370	117.9370	121.8682	117.9370	121.8682	117.9370	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	(71)
Water heating gains (Table 5)	144.4061	141.7467	136.4872	124.7747	117.6415	110.1681	105.4961	109.2317	113.6270	121.9200	133.1380	142.8943	(72)
Total internal gains	529.8783	541.9973	518.7032	499.4292	473.8574	453.6801	435.9679	437.5612	451.2863	470.1408	499.7975	519.2575	(73)

6. Solar gains

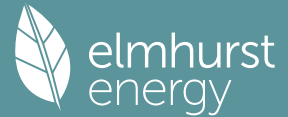
[Jan]	Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W							
Southeast	4.8600	36.7938	0.6300	0.7000	0.7700	54.6491	(77)						
Northwest	3.2400	11.2829	0.6300	0.7000	0.7700	11.1722	(81)						
Solar gains	65.8213	115.8290	168.3393	225.1023	267.2137	271.9147	259.3943	226.9632	187.8370	130.6734	79.5146	55.8920	(83)
Total gains	595.6996	657.8263	687.0425	724.5315	741.0710	725.5948	695.3622	664.5244	639.1233	600.8142	579.3120	575.1496	(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	38.2028	38.4990	38.7938	40.2411	40.5240	41.8949	41.8949	42.1590	41.3560	40.5240	39.9558	39.3786	
alpha	3.5469	3.5666	3.5863	3.6827	3.7016	3.7930	3.7930	3.8106	3.7571	3.7016	3.6637	3.6252	
util living area	0.9970	0.9954	0.9925	0.9841	0.9620	0.8974	0.7884	0.8211	0.9405	0.9858	0.9951	0.9974	(86)
MIT	18.6986	18.8810	19.1999	19.7052	20.1831	20.6343	20.8528	20.8220	20.4883	19.8759	19.2507	18.7279	(87)

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Th 2	19.1258	19.1368	19.1476	19.1991	19.2089	19.2548	19.2548	19.2634	19.2370	19.2089	19.1892	19.1688 (88)
util rest of house	0.9956	0.9931	0.9884	0.9739	0.9310	0.7938	0.5613	0.6149	0.8741	0.9744	0.9922	0.9962 (89)
MIT 2	17.1492	17.3382	17.6631	18.1982	18.6668	19.0950	19.2277	19.2242	18.9709	18.3761	17.7429	17.2073 (90)
Living area fraction									FLA = Living area / (4) =			0.3243 (91)
MIT	17.6517	17.8386	18.1615	18.6869	19.1586	19.5942	19.7548	19.7424	19.4630	18.8625	18.2319	17.7005 (92)
Temperature adjustment												0.0000
adjusted MIT	17.6517	17.8386	18.1615	18.6869	19.1586	19.5942	19.7548	19.7424	19.4630	18.8625	18.2319	17.7005 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9938	0.9906	0.9851	0.9696	0.9298	0.8205	0.6414	0.6869	0.8862	0.9710	0.9899	0.9947	(94)
Useful gains	592.0105	651.6554	676.8105	702.4846	689.0486	595.3691	445.9997	456.4381	566.3960	583.3884	573.4384	572.1089	(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	2296.5649	2208.3893	1975.2895	1598.1422	1209.4330	783.3326	494.8200	520.9690	852.1366	1339.8003	1830.7500	2252.8256	(97)
Space heating kWh	1268.1884	1046.1251	966.0684	644.8734	387.1660	0.0000	0.0000	0.0000	0.0000	562.7704	905.2643	1250.4533	(98a)
Space heating requirement - total per year (kWh/year)												7030.9094	
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	1268.1884	1046.1251	966.0684	644.8734	387.1660	0.0000	0.0000	0.0000	0.0000	562.7704	905.2643	1250.4533	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												7030.9094	
Space heating per m2											(98c) / (4) =	95.0123	(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	1268.1884	1046.1251	966.0684	644.8734	387.1660	0.0000	0.0000	0.0000	0.0000	562.7704	905.2643	1250.4533	(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)	1268.1884	1046.1251	966.0684	644.8734	387.1660	0.0000	0.0000	0.0000	0.0000	562.7704	905.2643	1250.4533	(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	273.6952	241.8338	255.9760	222.3561	213.8070	190.7268	186.6303	194.9890	198.2169	223.3805	240.4662	270.3125	(64)
Efficiency of water heater	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	(216)
Fuel for water heating, kWh/month	273.6952	241.8338	255.9760	222.3561	213.8070	190.7268	186.6303	194.9890	198.2169	223.3805	240.4662	270.3125	(217)
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	(219)
(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	3.4822	3.1452	3.4822	3.3699	3.4822	3.3699	3.4822	3.3699	3.4822	3.3699	3.4822	3.3699	(222)
Lighting	28.6609	22.9929	20.7025	15.1676	11.7159	9.5720	10.6876	13.8921	18.0445	23.6754	26.7413	29.4575	(223)
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)
(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)	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)
(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)	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)
(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)	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)
(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)	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)
(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)	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)
(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)	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)
(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)	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)
(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												7030.9094	(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												2712.3903	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
central heating pump												41.0000	(230c)
Total electricity for the above, kWh/year												41.0000	(231)
Electricity for lighting (calculated in Appendix L)												231.3101	(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	10015.6098 (238)

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

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	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1	7030.9094	0.1539	1082.2816 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	2712.3903	0.1412	382.8650 (264)
Space and water heating			1465.1466 (265)
Pumps, fans and electric keep-hot	41.0000	0.1387	5.6872 (267)
Energy for lighting	231.3101	0.1443	33.3852 (268)
Total CO ₂ , kg/year			1504.2190 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			20.3300 (273)

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

	Energy kWh/year	Primary energy factor kg CO ₂ /kWh	Primary energy kWh/year
Space heating - main system 1	7030.9094	1.5699	11037.8182 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	2712.3903	1.5219	4128.1208 (278)
Space and water heating			15165.9390 (279)
Pumps, fans and electric keep-hot	41.0000	1.5128	62.0248 (281)
Energy for lighting	231.3101	1.5338	354.7912 (282)
Total Primary energy kWh/year			15582.7549 (286)
Dwelling Primary energy Rate (DPER)			210.5800 (287)