

Energy Statement

88 Alexandra Park Road

Job number: S10766

Date: September 2025

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1 Executive Summary

This report has been produced by Base Energy on behalf of Mukhbinder Chana and in support of the planning application for the development named as 88 Alexandra Park Road comprising of the conversion of three floors of an existing building into three apartments and the construction of one new build duplex apartment and two semi-detached dwellings falling under the requirements of Haringey District Council.

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 London Plan Policy SI 2 Minimising greenhouse gas emissions
- The Haringey Local Plan SP4 Working Towards A Low Carbon Haringey.

The above policies require:

- A minimum 35 per cent reduction in CO2 over Part L 2021
- All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from onsite renewable energy regeneration.
- A 10 per cent reduction through energy efficiency measures alone.
- The GLA expects all major development proposals to maximise on-site renewable energy generation. This is regardless of whether the 35 per cent on-site target has already been reached through earlier stages of the energy hierarchy. In particular, solar PV should be maximised on roof spaces.

The design of the development will incorporate energy efficient building fabric and services in addition to low carbon technology:

- Thermal specification exceeding or meeting Part L 2021 notional U-values.
- A design which limits air permeability, targeting 4 and 5 for the existing apartments.
- A design which limits thermal bridging by incorporating targeting the notional ψ -value 0.05

-
- Energy saving building services including low energy lighting, shower wastewater heat recovery, heating controls and DMEV.
 - Solar PV Panels – 6.4kWp for the total development with 3.2kWp for plot 2 and 1.6kWp for plots 5 and 6.
 - ASHP for space and water heating to be installed in the new build plots for space and water heating with a SCOP at 35°C of 4.73.
 - The existing apartment to have Air Source Heat pumps for hot water heat only with a SCOP 3.4.

This results in 61% total site reduction in CO2 emissions over Part L1 2021. For the new build elements, a 94% CO2 reduction over Part L1 2021. For the change of use elements, a 35% CO2 reduction over Part L 2021.

2 Existing and Proposed Development

The development site is located on land at 88 Alexandra Park Road in London.

The development proposals are for the conversion of three floors of an existing building into three apartments and the construction of one new build duplex apartment as well as two semi-detached dwellings.

The development proposals constitute a minor 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 2025

The NPPF was updated in February 2025 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.

Local Planning Policy

The relevant Haringey Local Planning Policy requirements are as follows.

The development should target:

SP4: Working towards a Low Carbon Haringey

- A minimum 35 per cent reduction in CO₂ over Part L 2021
- All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from onsite renewable energy regeneration.
- A 10 per cent reduction through energy efficiency measures alone.
- The GLA expects all major development proposals to maximise on-site renewable energy generation. This is regardless of whether the 35 per cent on-site target has already been reached through earlier stages of the energy hierarchy. In particular, solar PV should be maximised on roof spaces.

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: Total Site - Baseline CO2

	CO2 Emission Rate (kg CO2/m2/year)	Floor Area (m2)	Total Baseline Emissions (kg CO2/year)
Baseline	15.3	346	5,280

The **Total Baseline CO2 Emissions** for the development are shown to be 5,280 kg/year.

Table 5.2: New Build Baseline CO2 emissions

	CO2 Emission Rate (kg CO2/m2/year)	Floor Area (m2)	Total Baseline Emissions (kg CO2/year)
Baseline	14.7	159	2,336

The **Baseline Energy Demand** for the development is shown to be 2,336 kWh per year.

Table 5.3: Change of Use Baseline CO2 emissions

	CO2 Emission Rate (kg CO2/m2/year)	Floor Area (m2)	Total Baseline Emissions (kg CO2/year)
Baseline	15.7	187	2,944

The **Baseline Energy Demand** for the development is shown to be 2,944 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: New Build Building Fabric Standards (including u-values W/m²K)

	Part L 2021 Limiting Parameters	Part L 2021 Notional Targets	Proposed Development
Walls	0.26	0.18	0.15
Ground Floor	0.18	0.13	0.12
Roof	0.16	0.11	0.10
Windows	1.6	1.2	1.2
Doors	1.6	1.0	1.0
Air permeability	8.00	5.00	4.00

Table 6.1: Change of Use Building Fabric Standards (including u-values W/m²K)

	Part L 2021 Notional Targets	Proposed Development
Walls	0.30	0.24
New walls	0.18	0.18
Wall to commercial	0.30	0.36 (0.18 with shelter factor)
Ground Floor	0.25	0.15
Roof	0.16	0.12
Windows	1.4	1.2
Doors	1.4	1.0

- Insulation: The specified building envelope is designed to exceed the notional 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 targeting a global 'y-value' of 0.05
- The existing plots will be air tested targeting 5

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: Condensing 89.5% gas boiler for the new build development in line with the GLA guidance
- Space heating: Existing apartments electric panel heater
- Water heating: Air source heat pump for water heating alone
- Heating Controls: Comprising time temperature zone control
- Ventilation: Decentralised mechanical extract fans with an SFP 0.11 and 0.08 such as the greenwood unit CV3
- A Shower wastewater heat recovery system with a 0.972 utilisation factor and 43.6% efficiency such as the Zyphe Slim50

The specifications outlined above, and with the heating provided by a gas system as required by the GLA guidance, have been incorporated into the calculation to generate a dwelling emission rate to be measured against the baseline data.

Table 6.1: Total site - Baseline vs Be Lean CO2 With Notional PV saving

	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	15.3	346	5,280	N/A
Be Lean	12.34	346	4,234	30%

The **CO₂ Emissions reduction** as a result of energy efficient fabric and services is shown to be 4,234 kg/year.

Table 6.2: New Build - Baseline vs Be Lean CO2 With Notional PV saving

	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	14.7	159	2,336	N/A
Be Lean	10.28	159	1,634	30%

The **CO₂ Emissions reduction** as a result of energy efficient fabric and services is shown to be 702 kg/year.

Table 6.3: Change of use - 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	15.7	187	2,944	N/A
Be Lean	11.1	187	2,070	30%

The **CO₂ Emissions reduction** as a result of energy efficient fabric and services is shown to be 874 kg/year.

7 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:

- compliance 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)

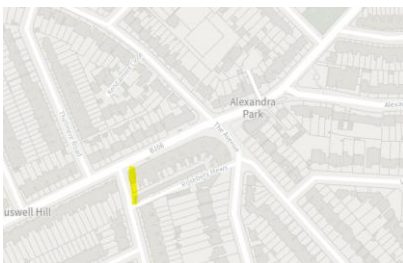
CHP is effectively an on-site small power plant providing both electrical power and thermal heat energy. It is an energy efficiency and low carbon measure rather than a renewable energy technology. A CHP system operates by burning a primary fuel (normally natural gas) by use of either a reciprocating 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 no existing or proposed heat networks or energy centres within a suitable radius from the development and there are no existing networks local to the site.

District heating **is not recommended** for this development

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 0.25Watts to 0.35Watts 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 PV to the existing building has not been allocated due to the feedback from the conservation officer.

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

The low carbon technology review indicates that Solar PV and ASHP would be potentially feasible. The following low carbon technology is recommended:

- **Solar PV totalling 6.4kWp with plot two having 3.2kWp (8 panels) and plots 5 and 6 having 1.6kWp each (4 panels per plot)**
- **New build houses and duplex apartment ASHP for space and water heating in the form of a SCOP at 35°C of 4.73**
- **Existing apartments to install ASHP for water heating only with a SCOP 3.4 in the form of a Dimplex EDEL 200L or equivalent**

This technology is deemed optimal for meeting the needs of the development and achieving policy compliance. It has been incorporated into the energy model and the results are presented in the next section. The feasibility of these technologies will need to be checked further with an installer.

8 Low Carbon Technology – Renewable Energy Generation - Be Green

The selected Low Carbon Technology has been incorporated into the calculation and the results are set out below.

Table 8.1: Total site wide - Baseline vs Be Lean & Green 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	15.3	346	5,280	N/A
Lean & Green Design	5.9	346	2,035	61%

The **CO₂ Emissions reduction** as a result of energy efficient fabric and services is shown to be 3,245 kg/year.

Table 8.2: New Build - Baseline vs Be Lean & Green 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	14.7	159	2,336	N/A
Lean & Green Design	0.8	159	133	94%

The **CO₂ Emissions reduction** as a result of energy efficient fabric and services is shown to be 2,203 kg/year.

Table 8.3: Total Site - CO2 reduction from the incorporation of renewable technologies – Be Lean vs Be Green 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
Notional	15.7	187	2,944	N/A
Be Green	10.2	187	1,905	35%

The **CO₂ Emissions reduction** as a result of energy efficient fabric and services is shown to be 1,039 kg/year.

Table 8.4: Total site – Be Green (no PV) vs Be Green CO2 With PV

	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	7.6	346	2,641	N/A
Lean & Green Design	5.9	346	2,038	23%

The **CO₂ Emissions reduction** as a result of the incorporation of renewable energy technology alone in the form of solar PV shown to be 603 kg/year.

Table 8.5: Total Development Fabric Energy Efficiency

	Fabric Energy Efficiency (kWh/m ² /year)
Baseline	67.2
Be Lean	50.7

Table 8.6: New Build Fabric Energy Efficiency

	Fabric Energy Efficiency (kWh/m ² /year)
Baseline	18.2
Be Lean	15.1

Table 8.7: Existing dwellings Fabric Energy Efficiency

	Fabric Energy Efficiency (kWh/m ² /year)
Baseline	49.0
Be Lean	35.7

9 Conclusion

Proposals are for the development named as 88 Alexandra Park Road comprising of the conversion of three floors of an existing building into three flats and the construction of one new build duplex apartment and two semi-detached dwellings falling under the requirements of Haringey District Council.

- A minimum 35 per cent reduction in CO2 over Part L 2021
- All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from onsite renewable energy regeneration.
- A 10 per cent reduction through energy efficiency measures alone
- The GLA expects all major development proposals to maximise on-site renewable energy generation. This is regardless of whether the 35 per cent on-site target has already been reached through earlier stages of the energy hierarchy. In particular, solar PV should be maximised on roof spaces.

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.

Low and zero carbon technology will be incorporated and is to comprise solar PV panels and for the new build plots an ASHP will be installed for space heating and hot water. For the change of use plots an ASHP for water heating will be installed.

This results in 61% total site reduction in CO2 emissions over Part L1 2021. For the new build elements, a 94% CO2 reduction in over Part L1 2021. For the change of use elements, a 35% CO2 reduction over Part L 2021.

This Energy Statement and the calculations on which it is based demonstrate that the proposed development complies with the local planning policy requirements.

10 Appendix 1 – Conversion - DER/TER Notional

Full SAP Calculation Printout



Property Reference	S10766 01			Issued on Date	10/09/2025
Assessment Reference	Notional	Prop Type Ref			
Property					
SAP Rating	44 E	DER	20.10	TER	
Environmental	88 B	% DER < TER			N/A
CO ₂ Emissions (t/year)	0.62	DFEE	108.87	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	208.26	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	36.0600 (1b)	2.9200 (2b)	105.2952 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	36.0600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	105.2952 (5)

2. Ventilation rate

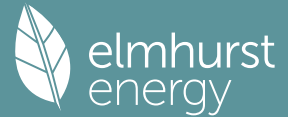
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) = 0.1899 (8)
Pressure test	No
Pressure Test Method	Blower Door
Measured/design AP50	15.0000 (17)
Infiltration rate	0.9399 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.7285 (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	0.9288	0.9106	0.8924	0.8013	0.7831	0.6920	0.6920	0.6738	0.7285	0.7831	0.8195	0.8559 (22b)
Effective ac	0.9313	0.9146	0.8982	0.8210	0.8066	0.7395	0.7395	0.7270	0.7653	0.8066	0.8358	0.8663 (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												
Windows			3.8900	1.3258	5.1572		(27)					
Door			2.4300	1.4000	3.4020		(26)					
Heat Loss Floor 1			36.0600	0.2500	9.0150		(28a)					
Old External wall	23.1256	3.8900	19.2356	0.3000	5.7707		(29a)					
Corridor wall	26.9500	2.4300	24.5200	0.1700	4.1684		(29a)					
Commercial wall	19.8000		19.8000	0.3000	5.9400		(29a)					
Total net area of external elements Aum(A, m2)			105.9356				(31)					
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.4533		(33)					
Main dwelling												
Party Wall 1			8.9100	0.0000	0.0000		(32)					
Party Ceiling 1			36.0600				(32b)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000 (35)					
Thermal bridges (Default value 0.200 * total exposed area)							21.1871 (36)					
Point Thermal bridges						(36a) =	0.0000					
Total fabric heat loss						(33) + (36) + (36a) =	54.6404 (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	32.3608	31.7789	31.2084	28.5291	28.0278	25.6941	25.6941	25.2620	26.5930	28.0278	29.0419	30.1021 (38)

Full SAP Calculation Printout



Heat transfer coeff
87.0012 86.4193 85.8488 83.1695 82.6682 80.3345 80.3345 79.9024 81.2334 82.6682 83.6823 84.7425 (39)
Average = Sum(39)m / 12 = 83.1671

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	2.4127	2.3965	2.3807	2.3064	2.2925	2.2278	2.2278	2.2158	2.2527	2.2925	2.3206	2.3500	(40)
HLP (average)												2.3064	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.3060 (42)
Hot water usage for mixer showers 63.4107 62.4577 61.0691 58.4122 56.4515 54.2650 53.0221 54.4002 55.9109 58.2586 60.9725 63.1677 (42a)
Hot water usage for baths 19.9550 19.6586 19.2413 18.4718 17.8956 17.2567 16.9116 17.3260 17.7772 18.4609 19.2462 19.8875 (42b)
Hot water usage for other uses 28.0048 26.9865 25.9681 24.9498 23.9314 22.9130 22.9130 23.9314 24.9498 25.9681 26.9865 28.0048 (42c)
Average daily hot water use (litres/day) 102.4229 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	111.3705	109.1028	106.2785	101.8338	98.2785	94.4347	92.8468	95.6577	98.6379	102.6876	107.2052	111.0601	(44)
Energy conte	176.3836	155.3610	163.3461	139.4054	132.3018	116.1185	112.2901	118.4442	121.6304	139.3461	152.7335	173.8932	(45)
Energy content (annual)										Total = Sum(45)m =		1701.2539	
Distribution loss (46)m = 0.15 x (45)m	26.4575	23.3041	24.5019	20.9108	19.8453	17.4178	16.8435	17.7666	18.2446	20.9019	22.9100	26.0840	(46)
Water storage loss:												150.0000	(47)
Store volume												1.8800	(48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400	(49)
Temperature factor from Table 2b												1.0152	(55)
Enter (49) or (54) in (55)													
Total storage loss	31.4712	28.4256	31.4712	30.4560	31.4712	30.4560	31.4712	31.4712	30.4560	31.4712	30.4560	31.4712	(56)
If cylinder contains dedicated solar storage	31.4712	28.4256	31.4712	30.4560	31.4712	30.4560	31.4712	31.4712	30.4560	31.4712	30.4560	31.4712	(57)
Primary 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)
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	231.1172	204.7978	218.0797	192.3734	187.0354	169.0865	167.0237	173.1778	174.5984	194.0797	205.7015	228.6268	(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)
FV 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	231.1172	204.7978	218.0797	192.3734	187.0354	169.0865	167.0237	173.1778	174.5984	194.0797	205.7015	228.6268	(64)
12Total per year (kWh/year)												2345.6979	(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	102.4344	91.2070	98.0995	88.7267	87.7772	80.9838	81.1233	83.1696	82.8165	90.1195	93.1583	101.6064	(65)

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

Metabolic gains (Table 5), Watts
(66)m 65.3004 65.3004 65.3004 65.3004 65.3004 65.3004 65.3004 65.3004 65.3004 65.3004 65.3004 65.3004 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 64.0512 70.9139 64.0512 66.1863 64.0512 66.1863 64.0512 64.0512 66.1863 64.0512 66.1863 64.0512 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 111.7672 112.9270 110.0043 103.7824 95.9283 88.5465 83.6151 82.4553 85.3779 91.5999 99.4540 106.8357 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 29.5300 29.5300 29.5300 29.5300 29.5300 29.5300 29.5300 29.5300 29.5300 29.5300 29.5300 29.5300 (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) -52.2403 -52.2403 -52.2403 -52.2403 -52.2403 -52.2403 -52.2403 -52.2403 -52.2403 -52.2403 -52.2403 -52.2403 (71)
Water heating gains (Table 5) 137.6807 135.7246 131.8541 123.2315 117.9801 112.4775 109.0368 111.7870 115.0229 121.1283 129.3865 136.5677 (72)
Total internal gains 356.0892 362.1556 348.4998 335.7903 320.5498 309.8004 299.2932 300.8837 309.1772 319.3695 337.6169 350.0448 (73)

6. Solar gains

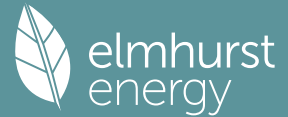
[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W							
West	3.8900	19.6403	0.6300	0.7000	0.7700	23.3490 (80)							
Solar gains	23.3490	45.6756	75.2213	109.7058	134.4485	137.6320	131.0313	112.5539	87.4855	54.1980	29.1135	19.2011	(83)
Total gains	379.4383	407.8313	423.7211	445.4961	454.9983	447.4324	430.3244	413.4376	396.6627	373.5675	366.7304	369.2459	(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	28.7831	28.9769	29.1695	30.1092	30.2918	31.1717	31.1717	31.3403	30.8268	30.2918	29.9247	29.5503	
alpha	2.9189	2.9318	2.9446	3.0073	3.0195	3.0781	3.0781	3.0894	3.0551	3.0195	2.9950	2.9700	
util living area	0.9852	0.9805	0.9720	0.9500	0.9047	0.8045	0.6763	0.7094	0.8652	0.9527	0.9782	0.9865	(86)
MIT	18.3920	18.5980	18.9773	19.5681	20.1211	20.6168	20.8448	20.8151	20.4620	19.7602	19.0289	18.4155	(87)
Th 2	19.0724	19.0821	19.0916	19.1369	19.1455	19.1858	19.1858	19.1933	19.1702	19.1455	19.1281	19.1102	(88)
util rest of house													

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MIT 2	0.9798	0.9731	0.9604	0.9265	0.8511	0.6773	0.4548	0.4996	0.7674	0.9254	0.9685	0.9815 (89)
Living area fraction	16.2395	16.5058	16.9913	17.7548	18.4247	18.9774	19.1474	19.1402	18.8288	18.0064	17.0802	16.2894 (90)
MIT	18.0905	18.3050	18.6991	19.3142	19.8835	20.3872	20.6071	20.5805	fLA = Living area / (4) =			0.8600 (91)
Temperature adjustment									20.2333	19.5146	18.7560	18.1178 (92)
adjusted MIT	18.0905	18.3050	18.6991	19.3142	19.8835	20.3872	20.6071	20.5805	20.2333	19.5146	18.7560	18.1178 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9760	0.9691	0.9573	0.9293	0.8760	0.7691	0.6369	0.6700	0.8316	0.9322	0.9660	0.9780	(94)
Useful gains	370.3287	395.2426	405.6446	414.0051	398.5635	344.1010	274.0780	276.9903	329.8645	348.2391	354.2570	361.1059	(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	1199.7942	1158.4473	1047.2820	866.1429	676.5153	464.9156	321.9094	334.0358	498.2268	736.9521	975.3980	1179.4270	(97)
Space heating kWh	617.1223	512.8736	477.3782	325.5392	206.7961	0.0000	0.0000	0.0000	0.0000	289.2025	447.2215	608.8309	(98a)
Space heating requirement - total per year (kWh/year)												3484.9643	
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	617.1223	512.8736	477.3782	325.5392	206.7961	0.0000	0.0000	0.0000	0.0000	289.2025	447.2215	608.8309	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3484.9643	
Space heating per m2											(98c) / (4) =	96.6435	(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)
Fraction of main heating from main system 2													0.0000 (203)
Fraction of total heating from main system 1													1.0000 (204)
Fraction of total heating from main system 2													0.0000 (205)
Efficiency of main space heating system 1 (in %)													100.0000 (206)
Efficiency of main space heating system 2 (in %)													219.3000 (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	617.1223	512.8736	477.3782	325.5392	206.7961	0.0000	0.0000	0.0000	0.0000	289.2025	447.2215	608.8309	(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)	617.1223	512.8736	477.3782	325.5392	206.7961	0.0000	0.0000	0.0000	0.0000	289.2025	447.2215	608.8309	(211)
Space heating efficiency (main heating system 2)	219.3000	219.3000	219.3000	219.3000	219.3000	0.0000	0.0000	0.0000	0.0000	219.3000	219.3000	219.3000	(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)
Space heating fuel used, main system 2												0.0000	(213)
Water heating													
Water heating requirement	231.1172	204.7978	218.0797	192.3734	187.0354	169.0865	167.0237	173.1778	174.5984	194.0797	205.7015	228.6268	(64)
Efficiency of water heater (217)m	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	(216)
Fuel for water heating, kWh/month	121.3851	107.5619	114.5377	101.0364	98.2329	88.8059	87.7225	90.9547	91.7008	101.9326	108.0365	120.0771	(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	13.6169	10.9240	9.8358	7.2061	5.5662	4.5477	5.0777	6.6002	8.5730	11.2482	12.7048	13.9953	(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												3484.9643	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												190.4000	
Water heating fuel used												1231.9842	(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)												109.8960	(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												4826.8445	(238)

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

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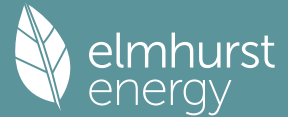
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	3484.9643	0.1537	535.6402 (261)
Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1231.9842	0.1408	173.4521 (264)
Space and water heating			709.0923 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	109.8960	0.1443	15.8614 (268)
Total CO2, kg/year			724.9537 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			20.1000 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	3484.9643	1.5690	5468.0439 (275)
Space heating - main system 2	0.0000	0.0000	0.0000 (276)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1231.9842	1.5206	1873.3409 (278)
Space and water heating			7341.3848 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	109.8960	1.5338	168.5621 (282)
Total Primary energy kWh/year			7509.9469 (286)
Dwelling Primary energy Rate (DPER)			208.2600 (287)

11 Appendix 2 - Conversion - DER/TER Be Lean

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Property Reference	S10766 01				Issued on Date	10/09/2025
Assessment Reference	Be Lean	Prop Type Ref				
Property						
SAP Rating	61 D	DER	13.99	TER		
Environmental	92 A	% DER < TER				N/A
CO ₂ Emissions (t/year)	0.45	DFEE	78.66	TFEE		
Compliance Check	N/A	% DFEE < TFEE				
% DPER < TPER		DPER	145.19	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)	36.0600		
Dwelling volume			

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	0 * 10 = 0.0000 (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) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.2500	(18)
Number of sides sheltered	3	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1938 (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	0.2470	0.2422	0.2373	0.2131	0.2083	0.1841	0.1841	0.1792	0.1938	0.2083	0.2180	0.2277 (22b)
Mechanical extract ventilation - decentralised												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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							
Windows			3.8900	1.1450	4.4542		(27)
Door			2.4300	1.0000	2.4300		(26)
Heat Loss Floor 1			36.0600	0.1500	5.4090		(28a)
Old External wall	23.1256	3.8900	19.2356	0.2400	4.6165		(29a)
Corridor wall	26.9500	2.4300	24.5200	0.1700	4.1684		(29a)
Commercial wall	19.8000		19.8000	0.1800	3.5640		(29a)
Total net area of external elements Aum(A, m ²)			105.9356				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		24.6421		(33)
Main dwelling							
Party Wall 1			8.9100	0.0000	0.0000		(32)
Party Ceiling 1			36.0600				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							21.1871 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	45.8293 (37)

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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	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	(38)
Heat transfer coeff	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	(39)
Average = Sum(39)m / 12 =													63.2030
HLP	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	(40)
HLP (average)													1.7527
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.3060 (42)
Hot water usage for mixer showers													
54.7638	53.9408	52.7415	50.4469	48.7536	46.8652	45.7918	46.9820	48.2867	50.3142	52.6581	54.5539	(42a)	
Hot water usage for baths													
19.9550	19.6586	19.2413	18.4718	17.8956	17.2567	16.9116	17.3260	17.7772	18.4609	19.2462	19.8875	(42b)	
Hot water usage for other uses													
28.0048	26.9865	25.9681	24.9498	23.9314	22.9130	22.9130	23.9314	24.9498	25.9681	26.9865	28.0048	(42c)	
Average daily hot water use (litres/day)												94.4507 (43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
102.7236	100.5859	97.9509	93.8685	90.5806	87.0350	85.6165	88.2394	91.0137	94.7433	98.8908	102.4463	(44)	
Energy content (annual)	162.6890	143.2329	150.5469	128.5013	121.9389	107.0196	103.5457	109.2589	112.2290	128.5657	140.8881	160.4061	(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1568.8221	
24.4034	21.4849	22.5820	19.2752	18.2908	16.0529	15.5319	16.3888	16.8343	19.2849	21.1332	24.0609	(46)	
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8800 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													1.0152 (55)
Total storage loss													
31.4712	28.4256	31.4712	30.4560	31.4712	30.4560	31.4712	31.4712	30.4560	31.4712	30.4560	31.4712	(56)	
If cylinder contains dedicated solar storage													
31.4712	28.4256	31.4712	30.4560	31.4712	30.4560	31.4712	31.4712	30.4560	31.4712	30.4560	31.4712	(57)	
Primary 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)
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													
217.4226	192.6697	205.2805	181.4693	176.6725	159.9876	158.2793	163.9925	165.1970	183.2993	193.8561	215.1397	(62)	
WWHRS	-35.4054	-31.3128	-32.7890	-27.1506	-25.3034	-21.6523	-20.2955	-21.5823	-22.4023	-26.4098	-29.9191	-34.7497	(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	182.0172	161.3569	172.4915	154.3187	151.3691	138.3354	137.9838	142.4102	142.7947	156.8895	163.9370	180.3900	(64)
12Total per year (kWh/year)													1884.2940 (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	97.8810	87.1744	93.8437	85.1011	84.3316	77.9584	78.2158	80.1155	79.6905	86.5350	89.2197	97.1219	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	64.0512	70.9139	64.0512	66.1863	64.0512	66.1863	64.0512	64.0512	66.1863	64.0512	66.1863	64.0512	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	111.7672	112.9270	110.0043	103.7824	95.9283	88.5465	83.6151	82.4553	85.3779	91.5999	99.4540	106.8357	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	(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)	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	(71)
Water heating gains (Table 5)	131.5605	129.7238	126.1340	118.1959	113.3489	108.2756	105.1288	107.6821	110.6813	116.3105	123.9162	130.5402	(72)
Total internal gains	349.9690	356.1548	342.7797	330.7547	315.9185	305.5985	295.3852	296.7787	304.8356	314.5517	332.1466	344.0173	(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

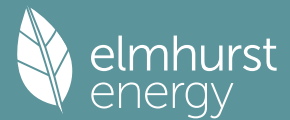
West						3.8900	19.6403	0.5000	0.0000			0.7700			29.4142 (80)

Solar gains	29.4142	57.5405	94.7610	138.2033	169.3733	173.3837	165.0684	141.7913	110.2110	68.2766	36.6761	24.1888	(83)		
Total gains	379.3833	413.6953	437.5407	468.9580	485.2918	478.9822	460.4536	438.5700	415.0466	382.8283	368.8227	368.2061	(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	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	
alpha	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	
util living area	0.9844	0.9773	0.9634	0.9273	0.8527	0.7140	0.5618	0.6042	0.8035	0.9365	0.9750	0.9861	(86)

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MIT	19.1731	19.3572	19.6743	20.1163	20.5339	20.8325	20.9480	20.9310	20.7252	20.1996	19.6099	19.1283 (87)
Th 2	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033 (88)
util rest of house	0.9792	0.9696	0.9502	0.8989	0.7908	0.5931	0.3900	0.4337	0.7025	0.9056	0.9649	0.9814 (89)
MIT 2	17.4774	17.7095	18.1075	18.6487	19.1272	19.4145	19.4898	19.4829	19.3316	18.7607	18.0320	17.4208 (90)
Living area fraction									fLA = Living area / (4) =			0.8600 (91)
MIT	18.9356	19.1265	19.4549	19.9108	20.3369	20.6339	20.7437	20.7282	20.5300	19.9981	19.3890	18.8892 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9356	19.1265	19.4549	19.9108	20.3369	20.6339	20.7437	20.7282	20.5300	19.9981	19.3890	18.8892 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9767	0.9671	0.9497	0.9078	0.8281	0.6878	0.5349	0.5764	0.7762	0.9174	0.9640	0.9789	(94)
Useful gains	370.5251	400.1034	415.5419	425.6998	401.8862	329.4405	246.2891	252.7797	322.1631	351.2258	355.5410	360.4415	(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	925.0153	899.1552	818.7870	695.9163	545.8797	381.3621	261.8972	273.5561	406.3954	593.9896	776.6986	928.4016	(97)
Space heating kWh	412.5407	335.3628	300.0144	194.5559	107.1311	0.0000	0.0000	0.0000	0.0000	180.6163	303.2335	422.5623	(98a)
Space heating requirement - total per year (kWh/year)												2256.0169	
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	412.5407	335.3628	300.0144	194.5559	107.1311	0.0000	0.0000	0.0000	0.0000	180.6163	303.2335	422.5623	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2256.0169	
Space heating per m2										(98c) / (4) =		62.5629	(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)
Fraction of main heating from main system 2													0.0000 (203)
Fraction of total heating from main system 1													1.0000 (204)
Fraction of total heating from main system 2													0.0000 (205)
Efficiency of main space heating system 1 (in %)													100.0000 (206)
Efficiency of main space heating system 2 (in %)													219.3000 (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	412.5407	335.3628	300.0144	194.5559	107.1311	0.0000	0.0000	0.0000	0.0000	180.6163	303.2335	422.5623	(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)	412.5407	335.3628	300.0144	194.5559	107.1311	0.0000	0.0000	0.0000	0.0000	180.6163	303.2335	422.5623	(211)
Space heating efficiency (main heating system 2)	219.3000	219.3000	219.3000	219.3000	219.3000	0.0000	0.0000	0.0000	0.0000	219.3000	219.3000	219.3000	(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)
Space heating fuel used, main system 2	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)
Water heating													
Water heating requirement	182.0172	161.3569	172.4915	154.3187	151.3691	138.3354	137.9838	142.4102	142.7947	156.8895	163.9370	180.3900	(64)
Efficiency of water heater (217)m	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	190.4000	(216)
Fuel for water heating, kWh/month	95.5973	84.7463	90.5943	81.0497	79.5006	72.6551	72.4705	74.7953	74.9972	82.3999	86.1014	94.7426	(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	1.2846	1.1602	1.2846	1.2431	1.2846	1.2431	1.2846	1.2846	1.2431	1.2846	1.2431	1.2846	(231)
Lighting	13.3086	10.6766	9.6131	7.0430	5.4402	4.4447	4.9627	6.4508	8.3789	10.9936	12.4172	13.6785	(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												2256.0169	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												190.4000	
Water heating fuel used												989.6502	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(MEVDecentralised, Database: total watage = 2.4725, total flow = 21.0000, SFP = 0.1177)													
mechanical ventilation fans (SFP = 0.1177)												15.1247	(230a)
Total electricity for the above, kWh/year												15.1247	(231)
Electricity for lighting (calculated in Appendix L)												107.4079	(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)

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Total delivered energy for all uses

3368.1997 (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	2256.0169	0.1543	347.9969 (261)
Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	989.6502	0.1405	139.0272 (264)
Space and water heating			487.0241 (265)
Pumps, fans and electric keep-hot	15.1247	0.1387	2.0980 (267)
Energy for lighting	107.4079	0.1443	15.5023 (268)
Total CO2, kg/year			504.6244 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			13.9900 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2256.0169	1.5711	3544.3947 (275)
Space heating - main system 2	0.0000	0.0000	0.0000 (276)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	989.6502	1.5194	1503.7017 (278)
Space and water heating			5048.0964 (279)
Pumps, fans and electric keep-hot	15.1247	1.5128	22.8806 (281)
Energy for lighting	107.4079	1.5338	164.7458 (282)
Total Primary energy kWh/year			5235.7228 (286)
Dwelling Primary energy Rate (DPER)			145.1900 (287)

12 Appendix 3 - Conversion - DER/TER Be Green

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Property Reference	S10766 01				Issued on Date	10/09/2025
Assessment Reference	Be Green	Prop Type Ref				
Property						
SAP Rating	65 D	DER	12.85	TER		
Environmental	93 A	% DER < TER				N/A
CO ₂ Emissions (t/year)	0.41	DFEE	78.66	TFEE		
Compliance Check	N/A	% DFEE < TFEE				
% DPER < TPER		DPER	132.25	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)	36.0600		105.2952 (1b) - (3b)
Dwelling volume			105.2952 (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	0 * 10 = 0.0000 (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) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.2500 (18)
Number of sides sheltered	3 (19)

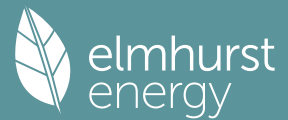
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1938 (21)

	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	0.2470	0.2422	0.2373	0.2131	0.2083	0.1841	0.1841	0.1792	0.1938	0.2083	0.2180	0.2277 (22b)
Mechanical extract ventilation - decentralised												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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							
Windows			3.8900	1.1450	4.4542		(27)
Door			2.4300	1.0000	2.4300		(26)
Heat Loss Floor 1			36.0600	0.1500	5.4090		(28a)
Old External wall	23.1256	3.8900	19.2356	0.2400	4.6165		(29a)
Corridor wall	26.9500	2.4300	24.5200	0.1700	4.1684		(29a)
Commercial wall	19.8000		19.8000	0.1800	3.5640		(29a)
Total net area of external elements Aum(A, m ²)			105.9356				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	24.6421		(33)
Main dwelling							
Party Wall 1			8.9100	0.0000	0.0000		(32)
Party Ceiling 1			36.0600				(32b)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (Default value 0.200 * total exposed area)							21.1871 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	45.8293 (37)

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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	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	17.3737	(38)
Heat transfer coeff	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	63.2030	(39)
Average = Sum(39)m / 12 =													63.2030
HLP	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	1.7527	(40)
HLP (average)													1.7527
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.3060 (42)
Hot water usage for mixer showers													
54.7638	53.9408	52.7415	50.4469	48.7536	46.8652	45.7918	46.9820	48.2867	50.3142	52.6581	54.5539	(42a)	
Hot water usage for baths													
19.9550	19.6586	19.2413	18.4718	17.8956	17.2567	16.9116	17.3260	17.7772	18.4609	19.2462	19.8875	(42b)	
Hot water usage for other uses													
28.0048	26.9865	25.9681	24.9498	23.9314	22.9130	22.9130	23.9314	24.9498	25.9681	26.9865	28.0048	(42c)	
Average daily hot water use (litres/day)												94.4507 (43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
102.7236	100.5859	97.9509	93.8685	90.5806	87.0350	85.6165	88.2394	91.0137	94.7433	98.8908	102.4463	(44)	
Energy content (annual)	162.6890	143.2329	150.5469	128.5013	121.9389	107.0196	103.5457	109.2589	112.2290	128.5657	140.8881	160.4061	(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1568.8221	
24.4034	21.4849	22.5820	19.2752	18.2908	16.0529	15.5319	16.3888	16.8343	19.2849	21.1332	24.0609	(46)	
Water storage loss:													
Store volume													201.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6100 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8694 (55)
Total storage loss													
26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	(56)	
If cylinder contains dedicated solar storage													
26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	(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													
189.6404	167.5761	177.4983	154.5833	148.8903	133.1016	130.4971	136.2103	138.3110	155.5171	166.9701	187.3575	(62)	
WWHRS	-35.4054	-31.3128	-32.7890	-27.1506	-25.3034	-21.6523	-20.2955	-21.5823	-22.4023	-26.4098	-29.9191	-34.7497	(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	154.2350	136.2633	144.7093	127.4327	123.5869	111.4494	110.2016	114.6280	115.9087	129.1073	137.0510	152.6078	(64)
12Total per year (kWh/year)													1557.1810 (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	54.0941	47.6249	50.0568	42.7267	40.5447	35.5840	34.4290	36.3286	37.3161	42.7481	46.8453	53.3350	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	65.3004	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	64.0512	70.9139	64.0512	66.1863	64.0512	66.1863	64.0512	64.0512	66.1863	64.0512	66.1863	64.0512	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	111.7672	112.9270	110.0043	103.7824	95.9283	88.5465	83.6151	82.4553	85.3779	91.5999	99.4540	106.8357	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	29.5300	(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)	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	-52.2403	(71)
Water heating gains (Table 5)	72.7071	70.8705	67.2807	59.3426	54.4955	49.4223	46.2755	48.8287	51.8280	57.4571	65.0629	71.6869	(72)
Total internal gains	291.1157	297.3014	283.9264	271.9014	257.0652	246.7452	236.5319	237.9254	245.9823	255.6984	273.2933	285.1640	(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
West				3.8900	19.6403	0.5000	0.0000			0.7700		29.4142 (80)
Solar gains	29.4142	57.5405	94.7610	138.2033	169.3733	173.3837	165.0684	141.7913	110.2110	68.2766	36.6761	24.1888 (83)
Total gains	320.5299	354.8419	378.6874	410.1047	426.4385	420.1289	401.6003	379.7166	356.1932	323.9750	309.9694	309.3528 (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	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	39.6210	
alpha	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	3.6414	
util living area	0.9909	0.9858	0.9761	0.9492	0.8898	0.7694	0.6242	0.6701	0.8561	0.9599	0.9853	0.9920	(86)

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MIT	19.0235	19.2113	19.5353	19.9942	20.4420	20.7824	20.9266	20.9028	20.6486	20.0723	19.4648	18.9778 (87)
Th 2	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033	19.5033 (88)
util rest of house	0.9877	0.9808	0.9670	0.9277	0.8376	0.6532	0.4422	0.4929	0.7677	0.9384	0.9791	0.9892 (89)
MIT 2	17.2886	17.5271	17.9371	18.5075	19.0358	19.3813	19.4830	19.4724	19.2694	18.6141	17.8519	17.2306 (90)
Living area fraction									fLA = Living area / (4) =			0.8600 (91)
MIT	18.7805	18.9754	19.3115	19.7860	20.2450	20.5862	20.7244	20.7025	20.4555	19.8681	19.2390	18.7331 (92)
Temperature adjustment												0.0000
adjusted MIT	18.7805	18.9754	19.3115	19.7860	20.2450	20.5862	20.7244	20.7025	20.4555	19.8681	19.2390	18.7331 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9856	0.9785	0.9655	0.9325	0.8663	0.7417	0.5945	0.6396	0.8290	0.9448	0.9777	0.9873 (94)
Useful gains	315.9299	347.2278	365.6394	382.4236	369.4377	311.6123	238.7681	242.8779	295.2897	306.0756	303.0540	305.4280 (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	915.2107	889.6102	809.7236	688.0291	540.0717	378.3441	260.6744	271.9323	401.6841	585.7721	767.2181	918.5363 (97)
Space heating kWh	445.8650	364.4810	330.3986	220.0359	126.9517	0.0000	0.0000	0.0000	0.0000	208.0942	334.1982	456.1525 (98a)
Space heating requirement - total per year (kWh/year)												2486.1771
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	445.8650	364.4810	330.3986	220.0359	126.9517	0.0000	0.0000	0.0000	0.0000	208.0942	334.1982	456.1525 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2486.1771
Space heating per m2										(98c) / (4) =		68.9456 (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)
Fraction of main heating from main system 2	0.0000 (203)
Fraction of total heating from main system 1	1.0000 (204)
Fraction of total heating from main system 2	0.0000 (205)
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	445.8650	364.4810	330.3986	220.0359	126.9517	0.0000	0.0000	0.0000	0.0000	208.0942	334.1982	456.1525 (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)	445.8650	364.4810	330.3986	220.0359	126.9517	0.0000	0.0000	0.0000	0.0000	208.0942	334.1982	456.1525 (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)
Space heating fuel used, main system 2	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)

Water heating												
Water heating requirement	154.2350	136.2633	144.7093	127.4327	123.5869	111.4494	110.2016	114.6280	115.9087	129.1073	137.0510	152.6078 (64)
Efficiency of water heater (217)m	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100	349.4100 (216)
Fuel for water heating, kWh/month	44.1416	38.9981	41.4153	36.4708	35.3702	31.8964	31.5393	32.8062	33.1727	36.9501	39.2235	43.6758 (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	1.2846	1.1602	1.2846	1.2431	1.2846	1.2431	1.2846	1.2846	1.2431	1.2846	1.2431	1.2846 (231)
Lighting	13.3086	10.6766	9.6131	7.0430	5.4402	4.4447	4.9627	6.4508	8.3789	10.9936	12.4172	13.6785 (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)
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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)
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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)
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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)
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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)
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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)
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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)
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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)
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Annual totals kWh/year												
Space heating fuel - main system 1												2486.1771 (211)

Space heating fuel - main system 2												0.0000 (213)
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Space heating fuel - secondary												0.0000 (215)
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Efficiency of water heater												349.4100
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Water heating fuel used												445.6601 (219)
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Space cooling fuel												0.0000 (221)
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Electricity for pumps and fans:												
(MEVDecentralised, Database: total watage = 2.4725, total flow = 21.0000, SFP = 0.1177)												

mechanical ventilation fans (SFP = 0.1177)												15.1247 (230a)
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Total electricity for the above, kWh/year												15.1247 (231)
---	--	--	--	--	--	--	--	--	--	--	--	---------------

Electricity for lighting (calculated in Appendix L)												107.4079 (232)
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Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												0.0000 (233)

Wind generation												0.0000 (234)
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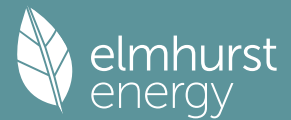
Hydro-electric generation (Appendix N)												0.0000 (235a)
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Electricity generated - Micro CHP (Appendix N)												0.0000 (235)
--	--	--	--	--	--	--	--	--	--	--	--	--------------

Appendix Q - special features												
Energy saved or generated												-0.0000 (236)

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

3054.3697 (238)

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

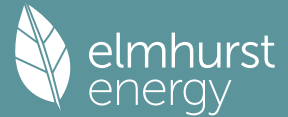
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2486.1771	0.1540	382.8843 (261)
Space heating - main system 2	0.0000	0.0000	0.0000 (262)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	445.6601	0.1409	62.7724 (264)
Space and water heating			445.6567 (265)
Pumps, fans and electric keep-hot	15.1247	0.1387	2.0980 (267)
Energy for lighting	107.4079	0.1443	15.5023 (268)
Total CO2, kg/year			463.2570 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			12.8500 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2486.1771	1.5702	3903.7141 (275)
Space heating - main system 2	0.0000	0.0000	0.0000 (276)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	445.6601	1.5208	677.7686 (278)
Space and water heating			4581.4828 (279)
Pumps, fans and electric keep-hot	15.1247	1.5128	22.8806 (281)
Energy for lighting	107.4079	1.5338	164.7458 (282)
Total Primary energy kWh/year			4769.1091 (286)
Dwelling Primary energy Rate (DPER)			132.2500 (287)

13 Appendix 4 - New Build - DER/TER Be Lean

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Property Reference	S10766 02				Issued on Date	10/09/2025	
Assessment Reference	Be Lean			Prop Type Ref			
Property							
SAP Rating	85 B	DER	14.01	TER	15.08		
Environmental	90 B	% DER < TER				7.10	
CO ₂ Emissions (t/year)	0.7	DFEE	35.43	TFEE	42.15		
Compliance Check	See BREL	% DFEE < TFEE				15.94	
% DPER < TPER	0.76	DPER	78.87	TPER	79.47		
Assessor Details	Mr. Peter Kinsella				Assessor ID	L770-0002	
Client							

SAP 10 WORKSHEET FOR New Build (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	27.7600 (1b)	x 2.5000 (2b)	= 69.4000 (1b) - (3b)
First floor	27.7600 (1c)	x 2.7000 (2c)	= 74.9520 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.5200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 144.3520 (5)

2. Ventilation rate

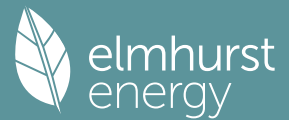
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (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) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	4.0000 (17)
Infiltration rate	0.2000 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1700 (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	0.2167	0.2125	0.2083	0.1870	0.1827	0.1615	0.1615	0.1573	0.1700	0.1827	0.1913	0.1998 (22b)
Mechanical extract ventilation - decentralised												0.5000 (23a)
If mechanical ventilation												0.5000 (23b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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							
Windows			7.9200	1.1450	9.0687		(27)
Door			2.4300	1.0000	2.4300		(26)
Heat Loss Floor 1			27.7600	0.1200	3.3312		(28a)
New wall	81.8960		73.9760	0.1500	11.0964		(29a)
Corridor wall	28.2400	2.4300	25.8100	0.1400	3.6134		(29a)
External Roof 1	27.7600		27.7600	0.1000	2.7760		(30)
Total net area of external elements Aum(A, m ²)			165.6560				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.3157		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							8.2828 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	40.5985 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 23.8181	Feb 23.8181	Mar 23.8181	Apr 23.8181	May 23.8181	Jun 23.8181	Jul 23.8181	Aug 23.8181	Sep 23.8181	Oct 23.8181	Nov 23.8181	Dec 23.8181	(38)
Heat transfer coeff	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	(39)
Average = Sum(39)m / 12 =												64.4166	(40)
HLP	1.1602	1.1602	1.1602	1.1602	1.1602	1.1602	1.1602	1.1602	1.1602	1.1602	1.1602	1.1602	(40)
HLP (average)												1.1602	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	(40)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.8526 (42)
Hot water usage for mixer showers	65.6464	64.6599	63.2223	60.4717	58.4419	56.1783	54.8916	56.3183	57.8822	60.3127	63.1223	65.3949	(42a)
Hot water usage for baths	23.8959	23.5411	23.0413	22.1198	21.4299	20.6648	20.2515	20.7478	21.2881	22.1068	23.0472	23.8152	(42b)
Hot water usage for other uses	33.6023	32.3804	31.1585	29.9366	28.7147	27.4928	27.4928	28.7147	29.9366	31.1585	32.3804	33.6023	(42c)
Average daily hot water use (litres/day)													113.2266 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	123.1446	120.5813	117.4221	112.5281	108.5864	104.3358	102.6359	105.7807	109.1069	113.5779	118.5499	122.8123	(44)
Energy content (annual)	195.0310	171.7062	180.4733	154.0454	146.1782	128.2930	124.1292	130.9787	134.5397	154.1242	168.8961	192.2944	(45)
Distribution loss (46)m = 0.15 x (45)m	29.2546	25.7559	27.0710	23.1068	21.9267	19.2440	18.6194	19.6468	20.1810	23.1186	25.3344	28.8442	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	14.3008	12.9039	14.2585	13.7388	14.1591	13.6641	14.0951	14.1150	13.6823	14.1821	13.7819	14.2928	(61)
Total heat required for water heating calculated for each month	209.3317	184.6101	194.7319	167.7842	160.3373	141.9572	138.2243	145.0937	148.2220	168.3063	182.6780	206.5872	(62)
WWHRS	-42.4412	-37.5353	-39.3048	-32.5459	-30.3316	-25.9550	-24.3287	-25.8711	-26.8541	-31.6580	-35.8646	-41.6552	(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	166.8906	147.0748	155.4271	135.2383	130.0056	116.0022	113.8957	119.2225	121.3679	136.6484	146.8134	164.9320	(64)
12Total per year (kWh/year)													
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	68.4230	60.3183	63.5720	54.6548	52.1440	46.0735	44.7967	47.0792	48.1550	54.7918	59.6034	67.5111	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	87.0484	96.3750	87.0484	89.9500	87.0484	89.9500	87.0484	89.9500	87.0484	89.9500	87.0484	89.9500	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	161.5247	163.2008	158.9770	149.9851	138.6345	127.9664	120.8395	119.1634	123.3872	132.3791	143.7298	154.3978	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	(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)	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	(71)
Water heating gains (Table 5)	91.9664	89.7593	85.4463	75.9095	70.0861	63.9909	60.2107	63.2784	66.8820	73.6449	82.7825	90.7407	(72)
Total internal gains	394.3281	403.1238	385.2603	369.6332	349.5576	332.6960	318.8873	320.2789	331.0078	346.8611	370.2509	385.9756	(73)

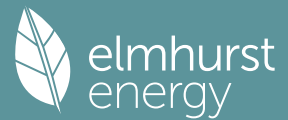
6. Solar gains

[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			
South				7.9200	46.7521	0.5000	0.0000	0.7700	142.5564 (78)			
Solar gains	142.5564	233.4706	297.4002	336.1268	350.2649	337.0823	329.3499	319.8444	310.6696	251.8200	168.9779	123.1818 (83)
Total gains	536.8845	636.5944	682.6605	705.7600	699.8224	669.7783	648.2372	640.1233	641.6774	598.6811	539.2289	509.1574 (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	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535
alpha	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902
util living area	0.9841	0.9643	0.9335	0.8715	0.7624	0.5933	0.4332	0.4575	0.6544	0.8762	0.9667	0.9876 (86)
MIT	19.9451	20.1843	20.4281	20.6833	20.8737	20.9713	20.9950	20.9934	20.9526	20.7198	20.2790	19.8834 (87)
Th 2	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519 (88)
util rest of house	0.9794	0.9542	0.9151	0.8367	0.7022	0.5055	0.3322	0.3561	0.5697	0.8356	0.9555	0.9838 (89)
MIT 2	18.7589	19.0564	19.3539	19.6516	19.8527	19.9366	19.9505	19.9498	19.9237	19.6994	19.1788	18.6814 (90)

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Living area fraction										FLA = Living area / (4) =	0.4503 (91)
MIT	19.2930	19.5643	19.8376	20.1162	20.3125	20.4025	20.4208	20.4197	20.3870	20.1589	19.6743 (92)
Temperature adjustment											-0.1500
adjusted MIT	19.1430	19.4143	19.6876	19.9662	20.1625	20.2525	20.2708	20.2697	20.2370	20.0089	19.5243 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9746	0.9479	0.9097	0.8372	0.7152	0.5315	0.3633	0.3873	0.5938	0.8381	0.9498	0.9795	(94)
Useful gains	523.2388	603.4386	620.9898	590.8581	500.4866	355.9671	235.4790	247.8925	381.0048	501.7789	512.1682	498.7444	(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	956.1378	934.9611	849.5021	712.8446	545.1222	364.1162	236.4611	249.2729	395.3261	606.0873	800.3280	958.0455	(97)
Space heating kWh	322.0769	222.7831	170.0132	87.8303	33.2089	0.0000	0.0000	0.0000	0.0000	77.6054	207.4751	341.7200	(98a)
Space heating requirement - total per year (kWh/year)												1462.7128	
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	322.0769	222.7831	170.0132	87.8303	33.2089	0.0000	0.0000	0.0000	0.0000	77.6054	207.4751	341.7200	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1462.7128	
Space heating per m2										(98c) / (4) =		26.3457	(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 %)													88.9000 (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	322.0769	222.7831	170.0132	87.8303	33.2089	0.0000	0.0000	0.0000	0.0000	77.6054	207.4751	341.7200	(98)
Space heating efficiency (main heating system 1)	88.9000	88.9000	88.9000	88.9000	88.9000	0.0000	0.0000	0.0000	0.0000	88.9000	88.9000	88.9000	(210)
Space heating fuel (main heating system)	362.2912	250.5997	191.2409	98.7967	37.3553	0.0000	0.0000	0.0000	0.0000	87.2952	233.3803	384.3869	(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	166.8906	147.0748	155.4271	135.2383	130.0056	116.0022	113.8957	119.2225	121.3679	136.6484	146.8134	164.9320	(64)
Efficiency of water heater													86.8000 (216)
(217)m	88.1719	88.0529	87.8845	87.6149	87.2192	86.8000	86.8000	86.8000	86.8000	87.5491	88.0176	88.2053	(217)
Fuel for water heating, kWh/month	189.2786	167.0300	176.8537	154.3554	149.0562	133.6431	131.2162	137.3532	139.8248	156.0820	166.8000	186.9865	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	9.0651	8.1879	9.0651	8.7727	9.0651	8.7727	9.0651	9.0651	8.7727	9.0651	8.7727	9.0651	(231)
Lighting	18.0869	14.5100	13.0647	9.5717	7.3935	6.0405	6.7446	8.7669	11.3873	14.9407	16.8755	18.5896	(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												1645.3463	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												86.8000	
Water heating fuel used												1888.4797	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(MEV)Decentralised, Database: total watage = 2.4725, total flow = 21.0000, SFP = 0.1177)													
mechanical ventilation fans (SFP = 0.1177)												20.7348	(230a)
central heating pump												41.0000	(230c)
main heating flue fan												45.0000	(230e)
Total electricity for the above, kWh/year												106.7348	(231)
Electricity for lighting (calculated in Appendix L)												145.9719	(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												3786.5327	(238)

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

Energy	Emission factor	Emissions
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Space heating - main system 1	kWh/year	kg CO2/kWh	kg CO2/year
Total CO2 associated with community systems	1645.3463	0.2100	345.5227 (261)
Water heating (other fuel)	1888.4797	0.2100	0.0000 (373)
Space and water heating			396.5807 (264)
Pumps, fans and electric keep-hot	106.7348	0.1387	742.1035 (265)
Energy for lighting	145.9719	0.1443	14.8054 (267)
Total CO2, kg/year			21.0683 (268)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			777.9771 (272)
			14.0100 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1645.3463	1.1300	1859.2413 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1888.4797	1.1300	2133.9821 (278)
Space and water heating			3993.2234 (279)
Pumps, fans and electric keep-hot	106.7348	1.5128	161.4684 (281)
Energy for lighting	145.9719	1.5338	223.8966 (282)
Total Primary energy kWh/year			4378.5883 (286)
Dwelling Primary energy Rate (DPER)			78.8700 (287)

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

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	27.7600 (1b)	x 2.5000 (2b)	= 69.4000 (1b) - (3b)
Ground floor	27.7600 (1c)	x 2.7000 (2c)	= 74.9520 (1c) - (3c)
First floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.5200	(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 144.3520 (5)
Dwelling volume			

2. Ventilation rate

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

Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1386 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000 (17)	
Infiltration rate		0.3886 (18)	
Number of sides sheltered		2 (19)	

Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3303 (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	0.4211	0.4128	0.4046	0.3633	0.3550	0.3138	0.3138	0.3055	0.3303	0.3550	0.3716	0.3881 (22b)
Effective ac	0.5887	0.5852	0.5818	0.5660	0.5630	0.5492	0.5492	0.5467	0.5545	0.5630	0.5690	0.5753 (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							
TER Opaque door			2.4300	1.0000	2.4300		(26)
TER Opening Type			7.9200	1.1450	9.0687		(27)
Heat Loss Floor 1			27.7600	0.1300	3.6088		(28a)
New wall	81.8960	7.9200	73.9760	0.1800	13.3157		(29a)
Corridor wall	28.2400	2.4300	25.8100	0.1800	4.6458		(29a)
External Roof 1	27.7600		27.7600	0.1100	3.0536		(30)
Total net area of external elements Aum(A, m2)			165.6560				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	36.1226		(33)

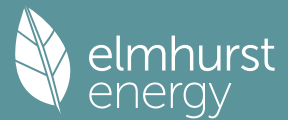
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000 (35)
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List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	4.5400	0.0500	0.2270
E3 Sill	4.5400	0.0500	0.2270
E4 Jamb	9.0400	0.0500	0.4520
E5 Ground floor (normal)	21.1800	0.1600	3.3888
E6 Intermediate floor within a dwelling	21.1800	0.0000	0.0000

7. Mean internal temperature (heating season)												
Temperature during heating periods in the living area from Table 9, Th1 (C)												
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	53.5306	53.6528	53.7731	54.3454	54.4538	54.9643	54.9643	55.0599	54.7665	54.4538	54.2349	54.0079
alpha	4.5687	4.5769	4.5849	4.6230	4.6303	4.6643	4.6643	4.6707	4.6511	4.6303	4.6157	4.6005
util living area												

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	0.9883	0.9765	0.9585	0.9179	0.8374	0.6821	0.5130	0.5380	0.7393	0.9172	0.9766	0.9904 (86)
MIT	19.6906	19.9138	20.1740	20.4935	20.7597	20.9338	20.9858	20.9821	20.8990	20.5681	20.0760	19.6525 (87)
Th 2	19.8430	19.8453	19.8475	19.8582	19.8602	19.8696	19.8696	19.8713	19.8660	19.8602	19.8562	19.8520 (88)
util rest of house												
	0.9845	0.9692	0.9453	0.8905	0.7820	0.5840	0.3877	0.4141	0.6496	0.8844	0.9680	0.9873 (89)
MIT 2	18.3592	18.6414	18.9671	19.3618	19.6622	19.8326	19.8653	19.8654	19.8028	19.4574	18.8567	18.3174 (90)
Living area fraction									fLA = Living area / (4) =			0.4503 (91)
MIT	18.9587	19.2144	19.5105	19.8714	20.1564	20.3285	20.3699	20.3682	20.2964	19.9575	19.4057	18.9186 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9587	19.2144	19.5105	19.8714	20.1564	20.3285	20.3699	20.3682	20.2964	19.9575	19.4057	18.9186 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9807	0.9642	0.9405	0.8909	0.7979	0.6260	0.4444	0.4701	0.6860	0.8877	0.9637	0.9840 (94)
Useful gains	502.5897	572.3203	589.5475	572.6515	506.0920	379.8576	260.8804	273.1811	401.1852	491.1822	491.6220	481.0090 (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	1055.7975	1028.6488	932.8627	778.3725	598.7467	401.8324	264.4434	277.8752	436.2274	662.5523	874.8132	1050.7398 (97)
Space heating kWh	411.5866	306.6528	255.4265	148.1191	68.9351	0.0000	0.0000	0.0000	0.0000	127.4993	275.8976	423.8797 (98a)
Space heating requirement - total per year (kWh/year)												2017.9968
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	411.5866	306.6528	255.4265	148.1191	68.9351	0.0000	0.0000	0.0000	0.0000	127.4993	275.8976	423.8797 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2017.9968
Space heating per m2										(98c) / (4) =		36.3472 (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 %)												92.4000 (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	411.5866	306.6528	255.4265	148.1191	68.9351	0.0000	0.0000	0.0000	0.0000	127.4993	275.8976	423.8797 (98)
Space heating efficiency (main heating system 1)	92.4000	92.4000	92.4000	92.4000	92.4000	0.0000	0.0000	0.0000	0.0000	92.4000	92.4000	92.4000 (210)
Space heating fuel (main heating system)	445.4401	331.8753	276.4356	160.3021	74.6051	0.0000	0.0000	0.0000	0.0000	137.9863	298.5905	458.7443 (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	204.3017	180.8444	192.6849	170.9095	166.3267	149.0096	147.0457	153.9359	156.5785	173.3092	182.6556	202.2818 (64)
Efficiency of water heater (217)m	85.8500	85.5030	84.9862	84.0762	82.6426	80.3000	80.3000	80.3000	80.3000	83.7333	85.2627	80.3000 (216)
Fuel for water heating, kWh/month	237.9750	211.5066	226.7248	203.2794	201.2603	185.5661	183.1204	191.7011	194.9919	206.9776	214.2270	85.9271 (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	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	18.0869	14.5100	13.0647	9.5717	7.3935	6.0405	6.7446	8.7669	11.3873	14.9407	16.8755	18.5896 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-26.3745	-37.3885	-54.0494	-61.1551	-66.3073	-62.0668	-61.3486	-57.7680	-51.4579	-42.9800	-29.0876	-22.7822 (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	-14.2716	-30.0973	-59.9440	-90.1932	-119.3889	-119.9647	-118.5053	-100.2358	-73.3673	-43.0393	-19.0581	-11.2759 (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												2183.9793 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												80.3000
Water heating fuel used												2492.7412 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												145.9719 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1372.1076 (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												3536.5848 (238)

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

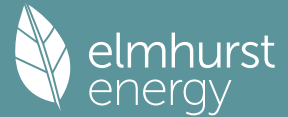
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2183.9793	0.2100	458.6356 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2492.7412	0.2100	523.4757 (264)
Space and water heating			982.1113 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	145.9719	0.1443	21.0683 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-572.7660	0.1344	-77.0051
PV Unit electricity exported	-799.3416	0.1259	-100.5994
Total			-177.6045 (269)
Total CO2, kg/year			837.5044 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.0800 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2183.9793	1.1300	2467.8966 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2492.7412	1.1300	2816.7976 (278)
Space and water heating			5284.6941 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	145.9719	1.5338	223.8966 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-572.7660	1.4969	-857.3591
PV Unit electricity exported	-799.3416	0.4620	-369.2679
Total			-1226.6271 (283)
Total Primary energy kWh/year			4412.0644 (286)
Target Primary Energy Rate (TPER)			79.4700 (287)

14 Appendix 5 - New Build - Be Green DER/TER

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Property Reference	S10766 02				Issued on Date	10/09/2025	
Assessment Reference	Be Green			Prop Type Ref			
Property							
SAP Rating	94 A	DER	0.49	TER	14.64		
Environmental	100 A	% DER < TER				96.65	
CO ₂ Emissions (t/year)	-0.01	DFEE	35.43	TFEE	42.15		
Compliance Check	See BREL	% DFEE < TFEE				15.94	
% DPER < TPER	72.83	DPER	20.94	TPER	77.07		
Assessor Details	Mr. Peter Kinsella				Assessor ID	L770-0002	
Client							

SAP 10 WORKSHEET FOR New Build (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	27.7600 (1b)	x 2.5000 (2b)	= 69.4000 (1b) - (3b)
First floor	27.7600 (1c)	x 2.7000 (2c)	= 74.9520 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.5200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	144.3520 (5)

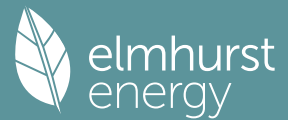
2. Ventilation rate

											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											0 * 10 =	0.0000 (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) =											0.0000 / (5) =	0.0000 (8)
Pressure test											Yes	
Pressure Test Method											Blower Door	
Measured/design AP50											4.0000 (17)	
Infiltration rate											0.2000 (18)	
Number of sides sheltered											2 (19)	
Shelter factor											(20) = 1 - [0.075 x (19)] = 0.8500 (20)	
Infiltration rate adjusted to include shelter factor											(21) = (18) x (20) = 0.1700 (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	0.2167	0.2125	0.2083	0.1870	0.1827	0.1615	0.1615	0.1573	0.1700	0.1827	0.1913	0.1998 (22b)
Mechanical extract ventilation - decentralised												
If mechanical ventilation											0.5000 (23a)	
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)											0.5000 (23b)	
Effective ac	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 (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							
Windows			7.9200	1.1450	9.0687		(27)
Door			2.4300	1.0000	2.4300		(26)
Heat Loss Floor 1			27.7600	0.1200	3.3312		(28a)
New wall	81.8960		73.9760	0.1500	11.0964		(29a)
Corridor wall	28.2400	2.4300	25.8100	0.1400	3.6134		(29a)
External Roof 1	27.7600		27.7600	0.1000	2.7760		(30)
Total net area of external elements Aum(A, m ²)			165.6560				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.3157		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
Thermal bridges (User defined value 0.050 * total exposed area)							8.2828 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	40.5985 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 23.8181	Feb 23.8181	Mar 23.8181	Apr 23.8181	May 23.8181	Jun 23.8181	Jul 23.8181	Aug 23.8181	Sep 23.8181	Oct 23.8181	Nov 23.8181	Dec 23.8181	(38)
Heat transfer coeff	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	64.4166	(39)
Average = Sum(39)m / 12 =												64.4166	(39)
HLP	Jan 1.1602	Feb 1.1602	Mar 1.1602	Apr 1.1602	May 1.1602	Jun 1.1602	Jul 1.1602	Aug 1.1602	Sep 1.1602	Oct 1.1602	Nov 1.1602	Dec 1.1602	(40)
HLP (average)												1.1602	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	(40)

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.8526	(42)
Hot water usage for mixer showers	65.6464	64.6599	63.2223	60.4717	58.4419	56.1783	54.8916	56.3183	57.8822	60.3127	63.1223	65.3949	(42a)	
Hot water usage for baths	23.8959	23.5411	23.0413	22.1198	21.4299	20.6648	20.2515	20.7478	21.2881	22.1068	23.0472	23.8152	(42b)	
Hot water usage for other uses	33.6023	32.3804	31.1585	29.9366	28.7147	27.4928	27.4928	28.7147	29.9366	31.1585	32.3804	33.6023	(42c)	
Average daily hot water use (litres/day)													113.2266	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	123.1446	120.5813	117.4221	112.5281	108.5864	104.3358	102.6359	105.7807	109.1069	113.5779	118.5499	122.8123	(44)	
Energy content (annual)	195.0310	171.7062	180.4733	154.0454	146.1782	128.2930	124.1292	130.9787	134.5397	154.1242	168.8961	192.2944	(45)	
Distribution loss (46)m = 0.15 x (45)m	29.2546	25.7559	27.0710	23.1068	21.9267	19.2440	18.6194	19.6468	20.1810	23.1186	25.3344	28.8442	(46)	
Water storage loss:														
Store volume													201.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6100	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													0.8694	(55)
Total storage loss	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	(56)	
If cylinder contains dedicated solar storage	26.9514	24.3432	26.9514	26.0820	26.9514	26.0820	26.9514	26.9514	26.0820	26.9514	26.0820	26.9514	(57)	
Primary 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)	
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	245.2448	217.0606	230.6871	202.6394	196.3920	176.8870	174.3430	181.1925	183.1337	204.3380	217.4901	242.5082	(62)	
WWHRS	-42.4412	-37.5353	-39.3048	-32.5459	-30.3316	-25.9550	-24.3287	-25.8711	-26.8541	-31.6580	-35.8646	-41.6552	(63a)	
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)	
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)	
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)	
Output from w/h	202.8036	179.5252	191.3823	170.0935	166.0604	150.9320	150.0143	155.3213	156.2797	172.6800	181.6255	200.8530	(64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2077.5708	(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	105.0188	93.3758	100.1784	90.0953	88.7753	81.5326	81.4440	83.7214	83.6097	91.4173	95.0331	104.1089	(65)	

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

Metabolic gains (Table 5), Watts	Jan 92.6289	Feb 92.6289	Mar 92.6289	Apr 92.6289	May 92.6289	Jun 92.6289	Jul 92.6289	Aug 92.6289	Sep 92.6289	Oct 92.6289	Nov 92.6289	Dec 92.6289	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	87.0484	96.3750	87.0484	89.9500	87.0484	89.9500	87.0484	87.0484	89.9500	87.0484	89.9500	87.0484	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	161.5247	163.2008	158.9770	149.9851	138.6345	127.9664	120.8395	119.1634	123.3872	132.3791	143.7298	154.3978	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	(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)	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	(71)
Water heating gains (Table 5)	141.1544	138.9521	134.6484	125.1324	119.3216	113.2398	109.4677	112.5288	116.1245	122.8728	131.9905	139.9314	(72)
Total internal gains	440.5161	449.3166	431.4625	415.8561	395.7931	381.9449	368.1443	369.5293	380.2504	393.0889	416.4589	432.1662	(73)

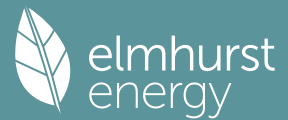
6. Solar gains

[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
South				7.9200	46.7521	0.5000		0.0000		0.7700		142.5564 (78)
Solar gains	142.5564	233.4706	297.4002	336.1268	350.2649	337.0823	329.3499	319.8444	310.6696	251.8200	168.9779	123.1818 (83)
Total gains	583.0725	682.7872	728.8627	751.9829	746.0580	719.0272	697.4942	689.3737	690.9200	644.9089	585.4368	555.3480 (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	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535	59.8535
alpha	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902	4.9902
util living area												
	0.9779	0.9538	0.9177	0.8476	0.7306	0.5576	0.4037	0.4262	0.6160	0.8485	0.9549	0.9822 (86)
Living	20.0257	20.2564	20.4889	20.7263	20.8959	20.9781	20.9964	20.9952	20.9636	20.7635	20.3518	19.9656

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Non living	18.8594	19.1438	19.4243	19.6967	19.8718	19.9405	19.9509	19.9504	19.9308	19.7435	19.2664	18.7845
24 / 16	0	0	0	0	0	0	0	0	0	0	0	0
24 / 9	3	0	0	0	0	0	0	0	0	0	0	0
16 / 9	28	0	0	0	0	0	0	0	0	0	0	10
MIT	20.5016	20.2564	20.4889	20.7263	20.8959	20.9781	20.9964	20.9952	20.9636	20.7635	20.3518	20.1103 (87)
Th 2	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519	19.9519 (88)
util rest of house												
	0.9715	0.9414	0.8962	0.8095	0.6691	0.4730	0.3090	0.3310	0.5332	0.8034	0.9406	0.9770 (89)
MIT 2	19.5164	19.1438	19.4243	19.6967	19.8718	19.9405	19.9509	19.9504	19.9308	19.7435	19.2664	18.9948 (90)
Living area fraction									FLA = Living area / (4) =			0.4503 (91)
MIT	19.9600	19.6448	19.9037	20.1603	20.3330	20.4077	20.4216	20.4208	20.3958	20.2028	19.7551	19.4971 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9600	19.6448	19.9037	20.1603	20.3330	20.4077	20.4216	20.4208	20.3958	20.2028	19.7551	19.4971 (93)

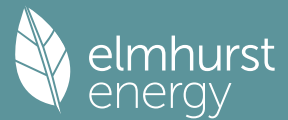
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9716	0.9372	0.8950	0.8177	0.6925	0.5105	0.3517	0.3739	0.5693	0.8152	0.9374	0.9742 (94)
Useful gains	566.4914	639.8767	652.3630	614.8886	516.6441	367.0851	245.2943	257.7830	393.3209	525.7502	548.7691	541.0290 (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	1008.7638	949.8075	863.4208	725.3492	556.1058	374.1124	246.1773	259.0087	405.5568	618.5804	815.2005	985.3890 (97)
Space heating kWh	329.0507	208.2735	157.0269	79.5317	29.3595	0.0000	0.0000	0.0000	0.0000	69.0657	191.8306	330.6038 (98a)
Space heating requirement - total per year (kWh/year)												1394.7424
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	329.0507	208.2735	157.0269	79.5317	29.3595	0.0000	0.0000	0.0000	0.0000	69.0657	191.8306	330.6038 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1394.7424
Space heating per m2										(98c) / (4) =		25.1214 (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 %)												265.8176 (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	329.0507	208.2735	157.0269	79.5317	29.3595	0.0000	0.0000	0.0000	0.0000	69.0657	191.8306	330.6038 (98)
Space heating efficiency (main heating system 1)	265.8176	265.8176	265.8176	265.8176	265.8176	0.0000	0.0000	0.0000	0.0000	265.8176	265.8176	265.8176 (210)
Space heating fuel (main heating system)	123.7882	78.3521	59.0732	29.9196	11.0450	0.0000	0.0000	0.0000	0.0000	25.9824	72.1662	124.3724 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	202.8036	179.5252	191.3823	170.0935	166.0604	150.9320	150.0143	155.3213	156.2797	172.6800	181.6255	200.8530 (64)
Efficiency of water heater (217)m	175.6200	175.6200	175.6200	175.6200	175.6200	175.6200	175.6200	175.6200	175.6200	175.6200	175.6200	175.6200 (216)
Fuel for water heating, kWh/month	115.4787	102.2237	108.9752	96.8531	94.5566	85.9424	85.4198	88.4417	88.9874	98.3259	103.4196	114.3680 (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	1.7610	1.5906	1.7610	1.7042	1.7610	1.7042	1.7610	1.7610	1.7042	1.7610	1.7042	1.7610 (231)
Lighting	18.0869	14.5100	13.0647	9.5717	7.3935	6.0405	6.7446	8.7669	11.3873	14.9407	16.8755	18.5896 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-29.4899	-47.4227	-77.5588	-93.8190	-103.2671	-95.7409	-94.2065	-87.1600	-73.0688	-56.1087	-33.7048	-24.4983 (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	-10.1266	-26.8952	-68.7176	-127.3650	-189.2856	-199.1711	-193.7751	-152.0628	-96.5056	-44.4563	-14.9557	-7.4997 (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												524.6991 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												175.6200
Water heating fuel used												1182.9922 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans: (MEVDecentralised, Database: total watage = 2.4725, total flow = 21.0000, SFP = 0.1177)												
mechanical ventilation fans (SFP = 0.1177)												20.7348 (230a)
Total electricity for the above, kWh/year												20.7348 (231)
Electricity for lighting (calculated in Appendix L)												145.9719 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1946.8616 (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												-72.4636 (238)

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

	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1	524.6991	0.1566	82.1919 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	1182.9922	0.1406	166.3708 (264)
Space and water heating			248.5626 (265)
Pumps, fans and electric keep-hot	20.7348	0.1387	2.8762 (267)
Energy for lighting	145.9719	0.1443	21.0683 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-816.0454	0.1331	-108.6439
PV Unit electricity exported	-1130.8162	0.1210	-136.8620
Total			-245.5059 (269)
Total CO ₂ , kg/year			27.0012 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			0.4900 (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	524.6991	1.5799	828.9571 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	1182.9922	1.5200	1798.1553 (278)
Space and water heating			2627.1124 (279)
Pumps, fans and electric keep-hot	20.7348	1.5128	31.3676 (281)
Energy for lighting	145.9719	1.5338	223.8966 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-816.0454	1.4920	-1217.5228
PV Unit electricity exported	-1130.8162	0.4440	-502.1132
Total			-1719.6360 (283)
Total Primary energy kWh/year			1162.7405 (286)
Dwelling Primary energy Rate (DPER)			20.9400 (287)

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	27.7600 (1b)	x 2.5000 (2b)	= 69.4000 (1b) - (3b)
First floor	27.7600 (1c)	x 2.7000 (2c)	= 74.9520 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	55.5200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 144.3520 (5)

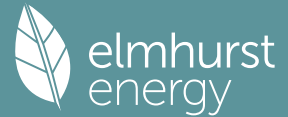
2. Ventilation rate

	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) = 0.1386 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3886 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3303 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 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	0.4211 0.4128 0.4046 0.3633 0.3550 0.3138 0.3138 0.3055 0.3303 0.3550 0.3716 0.3881 (22b)
Effective ac	0.5887 0.5852 0.5818 0.5660 0.5630 0.5492 0.5492 0.5467 0.5545 0.5630 0.5690 0.5753 (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							

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TER Opaque door			2.4300	1.0000	2.4300	(26)
TER Opening Type			7.9200	1.1450	9.0687	(27)
Heat Loss Floor 1			27.7600	0.1300	3.6088	(28a)
New wall	81.8960	7.9200	73.9760	0.1800	13.3157	(29a)
Corridor wall	28.2400	2.4300	25.8100	0.1800	4.6458	(29a)
External Roof 1	27.7600		27.7600	0.1100	3.0536	(30)
Total net area of external elements Aum(A, m2)			165.6560			(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.1226	(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	4.5400	0.0500	0.2270
E3 Sill	4.5400	0.0500	0.2270
E4 Jamb	9.0400	0.0500	0.4520
E5 Ground floor (normal)	21.1800	0.1600	3.3888
E6 Intermediate floor within a dwelling	21.1800	0.0000	0.0000
E14 Flat roof	21.1800	0.0800	1.6944
E16 Corner (normal)	20.8000	0.0900	1.8720

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 7.8612 (36)

Point Thermal bridges

Total fabric heat loss (33) + (36) + (36a) = 43.9838 (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	28.0415	27.8775	27.7167	26.9617	26.8204	26.1628	26.1628	26.0410	26.4161	26.8204	27.1062	27.4049
Heat transfer coeff	72.0252	71.8612	71.7005	70.9454	70.8042	70.1466	70.1466	70.0248	70.3999	70.8042	71.0900	71.3887
Average = Sum(39)m / 12 =												70.9448

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2973	1.2943	1.2914	1.2778	1.2753	1.2634	1.2634	1.2613	1.2680	1.2753	1.2804	1.2858
HLP (average)												1.2778
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.8526
Hot water usage for mixer showers												
55.2812	54.4504	53.2398	50.9236	49.2142	47.3080	46.2245	47.4259	48.7429	50.7896	53.1556	55.0694	(42a)
Hot water usage for baths												
23.8959	23.5411	23.0413	22.1198	21.4299	20.6648	20.2515	20.7478	21.2881	22.1068	23.0472	23.8152	(42b)
Hot water usage for other uses												
33.6023	32.3804	31.1585	29.9366	28.7147	27.4928	27.4928	28.7147	29.9366	31.1585	32.3804	33.6023	(42c)
Average daily hot water use (litres/day)												103.6702

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	112.7794	110.3718	107.4396	102.9800	99.3588	95.4655	93.9688	96.8884	99.9676	104.0549	108.5832	112.4868
Energy conte	178.6150	157.1680	165.1306	140.9744	133.7560	117.3860	113.6471	119.9681	123.2701	141.2015	154.6967	176.1272
Energy content (annual)												
Distribution loss (46)m = 0.15 x (45)m												
26.7923	23.5752	24.7696	21.1462	20.0634	17.6079	17.0471	17.9952	18.4905	21.1802	23.2045	26.4191	(46)

Water storage loss:

Store volume

a) If manufacturer declared loss factor is known (kWh/day):

Temperature factor from Table 2b

Enter (49) or (54) in (55)

Total storage loss

27.7463	25.0612	27.7463	26.8513	27.7463	26.8513	27.7463	27.7463	26.8513	27.7463	26.8513	27.7463	(56)
If cylinder contains dedicated solar storage												
27.7463	25.0612	27.7463	26.8513	27.7463	26.8513	27.7463	27.7463	26.8513	27.7463	26.8513	27.7463	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	(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												
229.6237	203.2404	216.1394	190.3377	184.7647	166.7493	164.6558	170.9768	172.6333	192.2102	204.0600	227.1359	(62)
WWHRS	-25.2723	-22.3510	-23.4047	-19.3800	-18.0615	-15.4553	-14.4869	-15.4054	-15.9907	-18.8512	-21.3562	(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	204.3515	180.8894	192.7347	170.9577	166.7033	151.2940	150.1689	155.5714	156.6427	173.3590	182.7038	(64)
12Total per year (kWh/year)												2087.7082
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	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000

Heat gains from water heating, kWh/month

100.1965	89.1163	95.7129	86.3646	85.2809	78.5215	78.5946	80.6964	80.4779	87.7565	90.9273	99.3693	(65)
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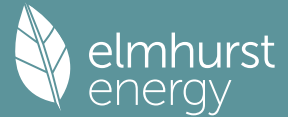
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289	92.6289
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
87.0484	96.3750	87.0484	89.9500	87.0484	89.9500	87.0484	87.0484	87.0484	89.9500	87.0484	89.9500	87.0484
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
161.5247	163.2008	158.9770	149.9851	138.6345	127.9664	120.8395	119.1634	123.3872	132.3791	143.7298	154.3978	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	32.2629	(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	(70)
Losses e.g. evaporation (negative values) (Table 5)												
-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	-74.1032	(71)
Water heating gains (Table 5)												
134.6727	132.6135	128.6464	119.9509	114.6248	109.0576	105.6380	108.4629	111.7749	117.9523	126.2879	133.5608	(72)
Total internal gains	437.0344	445.9780	428.4605	413.6747	394.0963	377.7627	364.3145	365.4633	375.9007	391.1684	413.7563	428.7957

6. Solar gains

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[Jan]	Area m2				Solar flux Table 6a W/m2	Specific data or Table 6b		g	Specific data or Table 6c	FF	Access factor Table 6d		Gains W
South	7.9200				46.7521	0.6300			0.7000		0.7700		113.1613 (78)
Solar gains	113.1613	185.3290	236.0763	266.8174	278.0403	267.5759	261.4380	253.8925	246.6095	199.8947	134.1347	97.7818	(83)
Total gains	550.1957	631.3070	664.5367	680.4921	672.1366	645.3386	625.7525	619.3558	622.5103	591.0631	547.8910	526.5774	(84)

7. Mean internal temperature (heating season)													

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	53.5306	53.6528	53.7731	54.3454	54.4538	54.9643	54.9643	55.0599	54.7665	54.4538	54.2349	54.0079	
alpha	4.5687	4.5769	4.5849	4.6230	4.6303	4.6643	4.6643	4.6707	4.6511	4.6303	4.6157	4.6005	
util living area	0.9846	0.9706	0.9495	0.9029	0.8138	0.6510	0.4838	0.5080	0.7086	0.8995	0.9696	0.9872	(86)
MIT	19.7569	19.9761	20.2307	20.5395	20.7896	20.9455	20.9888	20.9858	20.9156	20.6136	20.1383	19.7197	(87)
Th 2	19.8430	19.8453	19.8475	19.8582	19.8602	19.8696	19.8696	19.8713	19.8660	19.8602	19.8562	19.8520	(88)
util rest of house	0.9798	0.9618	0.9340	0.8722	0.7551	0.5538	0.3644	0.3894	0.6180	0.8622	0.9589	0.9832	(89)
MIT 2	18.4426	18.7184	19.0351	19.4129	19.6901	19.8398	19.8663	19.8667	19.8145	19.5065	18.9330	18.4021	(90)
Living area fraction	fLA = Living area / (4) =												0.4503 (91)
MIT	19.0344	19.2847	19.5735	19.9202	20.1852	20.3377	20.3718	20.3707	20.3103	20.0050	19.4757	18.9954	(92)
Temperature adjustment													0.0000
adjusted MIT	19.0344	19.2847	19.5735	19.9202	20.1852	20.3377	20.3718	20.3707	20.3103	20.0050	19.4757	18.9954	(93)

8. Space heating requirement													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9754	0.9565	0.9296	0.8741	0.7734	0.5958	0.4184	0.4430	0.6556	0.8677	0.9544	0.9792	(94)
Useful gains	536.6732	603.8262	617.7288	594.8151	519.8055	384.4912	261.8004	274.3685	408.0959	512.8373	522.9189	515.6157	(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	1061.2473	1033.7058	937.3766	781.8351	600.7877	402.4778	264.5766	278.0448	437.2050	665.9145	879.7902	1056.2245	(97)
Space heating kWh	390.2832	288.8791	237.8179	134.6544	60.2508	0.0000	0.0000	0.0000	0.0000	113.8894	256.9474	402.2129	(98a)
Space heating requirement - total per year (kWh/year)													1884.9351
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	390.2832	288.8791	237.8179	134.6544	60.2508	0.0000	0.0000	0.0000	0.0000	113.8894	256.9474	402.2129	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)													1884.9351
Space heating per m2	(98c) / (4) =												33.9506 (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 %)													92.3000 (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	390.2832	288.8791	237.8179	134.6544	60.2508	0.0000	0.0000	0.0000	0.0000	113.8894	256.9474	402.2129	(98)
Space heating efficiency (main heating system 1)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000	(210)
Space heating fuel (main heating system)	422.8420	312.9784	257.6576	145.8878	65.2772	0.0000	0.0000	0.0000	0.0000	123.3905	278.3828	435.7670	(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	204.3515	180.8894	192.7347	170.9577	166.7033	151.2940	150.1689	155.5714	156.6427	173.3590	182.7038	202.3316	(64)
Water heating requirement	204.3515	180.8894	192.7347	170.9577	166.7033	151.2940	150.1689	155.5714	156.6427	173.3590	182.7038	202.3316	(216)
Efficiency of water heater	85.4867	85.1041	84.5323	83.5301	82.0065	79.8000	79.8000	79.8000	79.8000	83.1410	84.8244	85.5700	(217)
Fuel for water heating, kWh/month	239.0449	212.5508	228.0013	204.6660	203.2806	189.5915	188.1816	194.9517	196.2941	208.5122	215.3906	236.4515	(219)
Space cooling fuel requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	18.0869	14.5100	13.0647	9.5717	7.3935	6.0405	6.7446	8.7669	11.3873	14.9407	16.8755	18.5896	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	-26.3745	-37.3885	-54.0494	-61.1551	-66.3073	-62.0668	-61.3486	-57.7680	-51.4579	-42.9800	-29.0876	-22.7822	(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)	-14.2716	-30.0973	-59.9440	-90.1932	-119.3889	-119.9647	-118.5053	-100.2358	-73.3673	-43.0393	-19.0581	-11.2759	(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													2042.1832 (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	79.8000	
Water heating fuel used	2516.9167	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	145.9719	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-1372.1076	(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	3418.9642	(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	2042.1832	0.2100	428.8585 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2516.9167	0.2100	528.5525 (264)
Space and water heating			957.4110 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	145.9719	0.1443	21.0683 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-572.7660	0.1344	-77.0051
PV Unit electricity exported	-799.3416	0.1259	-100.5994
Total			-177.6045 (269)
Total CO2, kg/year			812.8040 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.6400 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2042.1832	1.1300	2307.6670 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2516.9167	1.1300	2844.1158 (278)
Space and water heating			5151.7829 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	145.9719	1.5338	223.8966 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-572.7660	1.4969	-857.3591
PV Unit electricity exported	-799.3416	0.4620	-369.2679
Total			-1226.6271 (283)
Total Primary energy kWh/year			4279.1532 (286)
Target Primary Energy Rate (TPER)			77.0700 (287)

15 Appendix 6 - EUI Calculations

The Energy Use Intensity (EUI) for each dwelling has been calculated using DesignBuilder Software and is shown in the tables below:

Flat 1

	Pumps and fans (kWh)	Water Heating (kWh)	Space Heating (kWh)	Other Process (kWh)	Lighting (kWh)	Total
Jan 01-31	2.7	19.3	177.3	100.9	13.2	313.3
Feb 01-28	2.4	17.7	171.9	91.1	12.0	295.1
Mar 01-31	2.7	20.1	104.4	100.9	13.2	241.3
Apr 01-30	2.6	18.8	61.9	97.6	12.8	193.7
May 01-31	2.7	19.3	0.3	100.9	13.2	136.3
Jun 01-30	2.6	19.6	0.0	97.6	12.8	132.6
Jul 01-31	2.7	19.3	0.0	100.9	13.2	136.0
Aug 01-31	2.7	19.7	0.0	100.9	13.2	136.5
Sep 01-30	2.6	19.2	0.1	97.6	12.8	132.3
Oct 01-31	2.7	19.3	47.2	100.9	13.2	183.2
Nov 01-30	2.6	19.2	92.6	97.6	12.8	224.7
Dec 01-31	2.7	19.7	169.1	100.9	13.2	305.6
Summed total	31.4	231.1	824.8	1187.5	155.8	2430.7
EUI (kWh/m²)						65.7
Space Heating Demand (kWh/m²)						22.3

Flat 2

	Pumps and fans (kWh)	Water Heating (kWh)	Space Heating* (kWh)	Other Process (kWh)	Lighting (kWh)	Total	PV Generation (kWh)
Jan 01-31	2.7	27.6	18.1	141.0	17.5	206.8	-41
Feb 01-28	2.4	25.4	16.7	127.3	15.8	187.7	-74
Mar 01-31	2.7	28.9	15.6	141.0	17.5	205.6	-146
Apr 01-30	2.6	26.9	17.6	136.4	16.9	200.5	-266
May 01-31	2.7	27.6	2.5	141.0	17.5	191.3	-293
Jun 01-30	2.6	28.1	1.2	136.4	16.9	185.2	-334
Jul 01-31	2.7	27.6	0.0	141.0	17.5	188.8	-327
Aug 01-31	2.7	28.2	0.2	141.0	17.5	189.6	-264
Sep 01-30	2.6	27.5	1.9	136.4	16.9	185.4	-204
Oct 01-31	2.7	27.6	16.0	141.0	17.5	204.8	-102
Nov 01-30	2.6	27.5	13.7	136.4	16.9	197.1	-51
Dec 01-31	2.7	28.2	17.7	141.0	17.5	207.1	-27
Summed total	31.6	331.2	121.4	1659.7	205.9	2349.8	-2129
EUI (kWh/m ²)						41.9	38.0
Space Heating Demand (kWh/m ²)						10.3	

*Space Heating energy consumption figure based on ASHP SCOP 4.73

Flat 3

	Pumps and fans (kWh)	Water Heating (kWh)	Space Heating (kWh)	Other Process (kWh)	Lighting (kWh)	Total
Jan 01-31	2.7	76.8	117.9	221.2	26.5	445.1
Feb 01-28	2.4	70.7	101.2	199.8	24.0	398.1
Mar 01-31	2.7	80.3	94.6	221.2	26.5	425.2
Apr 01-30	2.6	74.8	106.0	214.0	25.7	423.1
May 01-31	2.7	76.8	5.7	221.2	26.5	332.9
Jun 01-30	2.6	78.2	1.2	214.0	25.7	321.7
Jul 01-31	2.7	76.8	0.0	221.2	26.5	327.2
Aug 01-31	2.7	78.5	0.2	221.2	26.5	329.1
Sep 01-30	2.6	76.5	2.9	214.0	25.7	321.7
Oct 01-31	2.7	76.8	95.2	221.2	26.5	422.4
Nov 01-30	2.6	76.5	75.8	214.0	25.7	394.6
Dec 01-31	2.7	78.5	113.9	221.2	26.5	442.8
Summed total	31.6	921.5	714.6	2604.0	312.4	4584.1
EUI (kWh/m ²)						61.2
Space Heating Demand (kWh/m ²)						9.7

Flat 4

	Pumps and fans (kWh)	Water Heating (kWh)	Space Heating (kWh)	Other Process (kWh)	Lighting (kWh)	Total
Jan 01-31	2.7	76.8	117.2	221.2	26.5	444.4
Feb 01-28	2.4	70.7	150.4	199.8	24.0	447.3
Mar 01-31	2.7	80.3	145.3	221.2	26.5	475.9
Apr 01-30	2.6	74.8	139.1	214.0	25.7	456.2
May 01-31	2.7	76.8	14.5	221.2	26.5	341.7
Jun 01-30	2.6	78.2	6.2	214.0	25.7	326.7
Jul 01-31	2.7	76.8	0.5	221.2	26.5	327.7
Aug 01-31	2.7	78.5	1.8	221.2	26.5	330.7
Sep 01-30	2.6	76.5	10.1	214.0	25.7	328.9
Oct 01-31	2.7	76.8	125.9	221.2	26.5	453.1
Nov 01-30	2.6	76.5	109.9	214.0	25.7	428.7
Dec 01-31	2.7	78.5	167.2	221.2	26.5	496.1
Summed total	31.6	921.5	988.1	2604.0	312.4	4857.5
EUI (kWh/m ²)						63.9
Space Heating Demand (kWh/m ²)						13.0

Mews Houses

	Pumps and fans (kWh)	Water Heating (kWh)	Space Heating* (kWh)	Other Process (kWh)	Lighting (kWh)	Total	PV Generation (kWh)
Jan 01-31	5.3	27.6	25.3	141.0	17.5	216.7	-38.0
Feb 01-28	4.8	25.4	22.2	127.3	15.8	195.6	-58.0
Mar 01-31	5.3	28.9	9.7	141.0	17.5	202.4	-104.0
Apr 01-30	5.1	26.9	12.6	136.4	17.0	198.0	-176.0
May 01-31	5.3	27.6	0.1	141.0	17.5	191.5	-183.0
Jun 01-30	5.1	28.1	0.0	136.4	17.0	186.6	-205.0
Jul 01-31	5.3	27.6	0.0	141.0	17.5	191.4	-203.0
Aug 01-31	5.3	28.3	0.0	141.0	17.5	192.0	-169.0
Sep 01-30	5.1	27.5	0.0	136.4	17.0	186.0	-142.0
Oct 01-31	5.3	27.6	11.9	141.0	17.5	203.3	-75.0
Nov 01-30	5.1	27.5	8.9	136.4	17.0	194.9	-46.0
Dec 01-31	5.3	28.3	25.6	141.0	17.5	217.6	-27.0
Summed total	62.2	331.5	116.2	1659.7	206.5	2376.1	-1426.0
EUI (kWh/m ²)						49.3	-29.6
Space Heating Demand (kWh/m ²)						11.4	

*Space Heating energy consumption figure based on ASHP SCOP 4.73