



Rose Avenue

Energy Strategy Report

Our Reference A1081

File Reference A1081-KCL-XX-XX-T-ME-1001

Issue Date 14/08/2025

Revision P02

REVISION SHEET

Revision	Description	Author	QA'd	Date
P01	Preliminary Issue	RA	-	24/04/2025
P02	Planning Issue	RA	NT	14/08/2025

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1 INTRODUCTION

This Energy Strategy Report has been prepared to outline the proposed energy strategy to be utilised at the new build residential development at 31 Rose Avenue, Gravesend, Kent.

The project anticipates the provision of 29 new residential flats across 4 blocks.

The site is located in a suburban area, surrounded by other residential homes.

The plans for the proposed development can be seen in Appendix A.

2 METHODOLOGY

The methodology that has been applied in this report is as follows:

1. Prepare baseline energy calculations for the site based on a Part L 2021 compliant construction specification designed for the development.
2. From the baseline energy calculations, the predicted energy demand for the development in kWh/year and the predicted CO₂ emissions in kgCO₂/year for the site can be established.
3. Apply energy efficient design principles (improved fabric specification) in order to reduce the energy demand and CO₂ emissions of the site. Prepare energy calculations using the improved fabric specification.
4. From these improved calculations, the reduced energy demand for the development in kWh/year and the predicted CO₂ emissions in kgCO₂/year for the site can be established.
5. Carry out a renewable energy feasibility study to ascertain which low and zero carbon (LZC) technologies would be suitable for the development.
6. Establish the sizing of suitable renewable technologies to ensure the CO₂ emission reduction target is met.

3 BASELINE MODELLING

3.1 PREDICTED ANNUAL CARBON EMISSIONS

Baseline SAP 10 calculations have been based on the construction specifications shown in the Table 1 below.

Aspect		Part L
Fabric Thermal Efficiency	External Walls	0.18 W/m ² K
	Communal Walls	0.00 W/m ² K
	Insulated Roofs	0.15 W/m ² K
	Ground Floors	0.18 W/m ² K
	Glazing	1.60 W/m ² K
	Communal Doors	N/A
	Thermal Bridging	Bespoke Psi Values
Ventilation	Air Tightness	5 m ³ /hrm ²
Heating	Heating	Gas boiler
	Hot Water	As per heating
	Controls	Time & temperature zone
Lighting	LED	100%
Ventilation		Natural with extract
Renewables / LZC		PV

Table 1. Part L compliant construction specifications

3.2 PREDICTED ANNUAL ENERGY DEMAND

Based on using the specification outlined in Table 1 above, this would create a total predicted energy demand for the development of 138,887.8 kWh/year. The breakdown of this predicted energy demand can be seen in Table 2 below. The figures quoted have been derived from the Design Stage SAP 10 calculations for the development.

Plot	Predicted Energy Requirement (kWh/yr)			
	Space Heating	Water Heating	Lighting, Pumps, Fans	Total
	Gas	Gas	Electric	
Block A Flat 1	2,129.66	2,672.38	169.44	4,971.48
Block A Flat 2	1,653.62	2,375.70	124.53	4,154.85
Block A Flat 3	2,045.21	2,672.33	169.44	4,886.98
Block A Flat 4	1,601.00	2,375.41	124.53	4,100.94
Block B Flat 1	2,129.66	2,672.38	169.44	4,971.48
Block B Flat 2	1,653.62	2,375.70	124.53	4,153.85
Block B Flat 3	2,045.21	2,672.33	169.44	4,886.98
Block B Flat 4	1,601.00	2,375.41	124.53	4,100.94
Block C Flat 1	1,365.82	2,383.08	124.53	3,873.43
Block C Flat 2	1,887.57	2,677.46	169.44	4,734.47
Block C Flat 3	2,298.29	2,707.61	176.48	5,182.38
Block C Flat 4	1,393.65	2,690.67	169.44	4,253.76
Block C Flat 5	1,393.65	2,690.67	169.44	4,253.76
Block C Flat 6	1,886.47	2,888.10	215.12	4,989.69
Block C Flat 7	1,828.34	2,676.16	169.44	4,673.94
Block C Flat 8	1,828.34	2,676.16	169.44	4,673.94
Block C Flat 9	2,448.87	2,872.66	215.12	5,536.65

Plot	Predicted Energy Requirement (kWh/yr)			
	Space Heating	Water Heating	Lighting, Pumps, Fans	Total
	Gas	Gas	Electric	
Block D Flat 1	2,737.96	2,890.83	221.55	5,850.34
Block D Flat 2	1,563.27	2,569.34	150.87	4,283.48
Block D Flat 3	1,563.27	2,569.34	150.87	4,283.48
Block D Flat 4	2,737.96	2,890.83	221.55	5,850.34
Block D Flat 5	2,032.19	2,906.13	221.55	5,159.87
Block D Flat 6	1,536.09	2,737.71	178.83	4,452.63
Block D Flat 7	1,536.09	2,737.71	178.83	4,452.63
Block D Flat 8	2,032.19	2,906.13	221.55	5,159.87
Block D Flat 9	2,617.43	2,890.97	221.55	5,729.95
Block D Flat 10	1,864.63	2,724.90	178.83	4,768.36
Block D Flat 11	1,864.63	2,724.90	178.83	4,768.36
Block D Flat 12	2,617.43	2,890.97	221.55	5,729.95
Total				138,887.80

Table 2. Baseline predicted annual energy demand

4 REDUCING CARBON EMISSIONS THROUGH ENERGY REDUCTION

The Energy Hierarchy sets out the most effective way to reduce a dwelling's CO₂ emissions. Firstly by reducing energy demand, then using energy efficiently and lastly by incorporating LZC/renewable technologies.

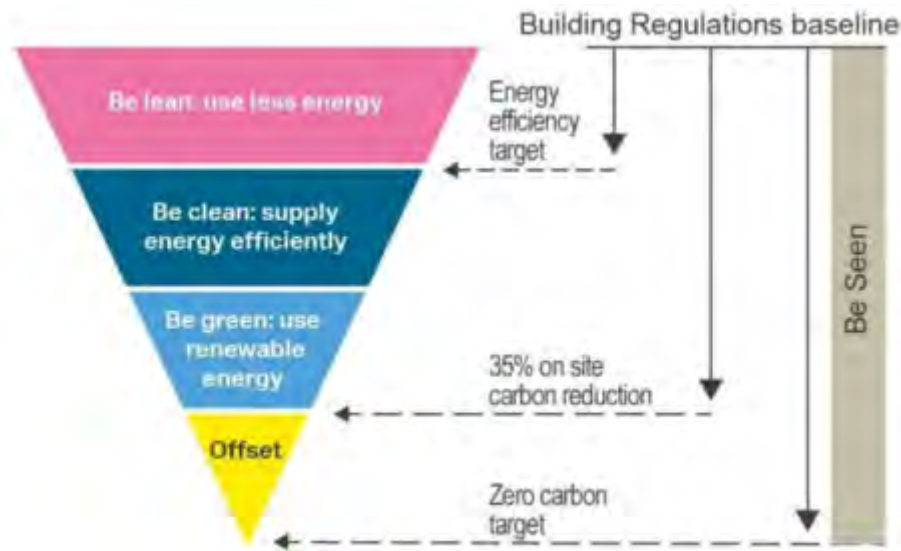


Figure 1. The Energy Hierarchy

Reducing the need for energy usage in the dwelling's design:

The first and most cost beneficial action is to reduce the amount of energy needed by the occupants of the dwelling whilst still maintaining or even improving the comfort conditions. A lot can be achieved through passive design, improving the dwelling's external fabric and following principles to reduce air infiltration.

The developer is attempting to reduce the energy demand and CO₂ emissions of the development by making the following fabric and energy efficiency improvements to their standard Part L 2021 building specification.

Energy reduction strategies include:

- ❏ Adopting enhanced fabric specifications.
- ❏ Installing high efficiency heating systems.
- ❏ Incorporating energy-efficient lighting: 100% of all new lighting shall be energy efficient.
- ❏ Adopting principles of airtight construction.
- ❏ All new windows shall be double-glazed.
- ❏ Passive solar design – solar gain, solar shading, thermal mass.
- ❏ Natural / passive ventilation strategy.

5 FEASIBILITY STUDY OF RENEWABLE TECHNOLOGIES

This section will assess the technical viability of the following renewable energy technologies for the site in order to rule out unfeasible options:

- ✘ Mast mounted wind turbines.
- ✘ Roof mounted wind turbines.
- ✘ Solar PV (photovoltaic) panels.
- ✘ Solar thermal panels.
- ✘ Waste Water Heat Recovery System (WWHRS)
- ✘ Air Source Heat Pump (ASHP)
- ✘ Ground Source Heat Pump (GSHP)
- ✘ Biomass
- ✘ CHP

The following observations have been made with regard to the technical feasibility of integrating renewable energy technologies into this development.

Renewable Technology	Feasible	Reasons
Mast mounted wind turbines	No	✘ There is no sufficient open land for a mast mounted wind turbine to be installed on site. ✘ The site is situated in a densely populated area. Surrounding properties aren't far enough away to be unaffected by turbine noise, reflected light and shadow flicker. ✘ The site area is surrounded by buildings and other obstructions that could cause uneven and turbulent wind patterns. Turbulent air conditions may reduce lifespan of components. ✘ Currently the BWEA suggests a large wind turbine to be viable where wind speed is 7 m/s or above. According to the NOABL database, the average wind speeds for the site is 5 m/s @ 10 m, 5.7 m/s @ 25 m and 6.2 m/s @ 45 m height for the property postcode. Therefore, the wind speeds are not sufficient for a mast mounted wind turbine to be viable.
Roof Mounted Wind Turbines	No	✘ The site area is surrounded by building and other structures that could cause uneven and turbulent wind patterns. Turbulent air conditions may reduce lifespan of components. ✘ Roof mounted wind turbines are not yet a proven technology and a number of technical problems have been identified by manufacturers which are being investigated to rectify these issues. Vibration that can be transmitted to the building structure. Noise from a turbine may cause irritation to occupants of the dwelling and adjacent buildings. Noise may also adversely affect the ventilation strategy. ✘ Currently the BWEA suggests a large wind turbine to be viable where wind speed is 7 m/s or above. According to the NOABL database, the average

Renewable Technology	Feasible	Reasons
		wind speeds for the site is 5 m/s @ 10 m, 5.7 m/s @ 25 m and 6.2 m/s @ 45 m height for the property postcode. Therefore, the wind speeds are not sufficient for a roof mounted wind turbine to be viable.
Solar PV (photovoltaics) panels	Yes	☒ The proposed development has sufficient roof area for solar panels accommodation. ☒ Most of the roofs should be free from overshadowing for most of the day from other buildings, structures and trees. ☒ The site is located in the region with high level of global horizontal irradiation (1,000 – 1,050 kWh/m²/yr).
Solar Thermal Panels	No	☒ Most of the roofs should be free from overshadowing for most of the day from other buildings, structures or trees. ☒ The site is located in the region with high level of global horizontal irradiation (1,000 – 1,050 kWh/m²/year). ☒ Solar thermal collectors would be compatible with the planned heating system. ☒ There will be a year round hot water demand. ☒ In practical domestic solar hot water systems, the solar hot water system is usually run in conjunction with, rather than instead of, a backup conventional boiler and as a result the carbon intensity of the combined system is high relative to other renewables. Moreover, the high efficiency of modern condensing boilers, which can exceed 90%, means that the carbon intensity of these heat sources is relatively low at 200 – 300 gCO₂/kWh_{th}. As a result, domestic solar water heating systems are a relatively expensive way of mitigating carbon emissions when they replace heat from efficient modern boilers. For this reason they are not recommended.
Air Source Heat Pump (ASHP)	Yes	☒ The proposed development has been designed to accommodate the space for heat pumps and a hot water cylinder. ☒ The building is suitable for a low-grade heat distribution system (eg underfloor water system, oversized radiators). ☒ Condenser units can be noisy and also blow out colder air to the immediate environment causing nuisance to the residents. Furthermore the noise generated could cause disruption, as plant equipment will need to be fitted to external walls near bedrooms and windows. ☒ With an air source heat pump it is possible to save on energy bills and reduce your carbon footprint compared to a gas or electric heating system.
Ground Source Heat Pump (GSHP)	No	☒ It will not be possible to drill a limited number of vertical or horizontal boreholes for GSHP on the site.

Renewable Technology	Feasible	Reasons
		☒ The building is suitable for a low-grade heat distribution system (eg underfloor water system, oversized radiators). ☒ The site and neighbourhood contain mature trees. Drilling boreholes on the site creates a risk of damaging their roots.
Biomass	No	☒ There isn't sufficient space for a delivery vehicle (vehicular access to fuel storage, turning circle etc). ☒ There isn't sufficient space in the proposed building for a wood-fuel boiler and associated auxiliary equipment. ☒ There isn't sufficient space for fuel storage to allow a reasonable number of deliveries. ☒ Biomass systems are management intensive (fuel sourcing, transport, storage) and require adequate expertise from users.
Combined Heat and Power (CHP)	No	☒ Given the proposed building use, there won't be a high demand for the heat for most of the year, therefore CHP won't be suitable. ☒ A CHP unit only generates economic and environmental savings when it is running at least 4500 hours per year. This equates to an average heat demand of around 17 hours a day for five days a week throughout the year. The proposed development is unlikely to have a heat demand profile that matches this requirement. ☒ CHP is typically utilised on buildings with high electricity and heating demand for most of the year such as local authority buildings, leisure centres, universities, hotels.

Table 3. Feasibility study of renewable technologies

Based on the feasibility study in Table 3 above, the following technologies have been identified as being feasible for the proposed development:

- ☒ Air source heat pumps.
- ☒ Solar PV.

6 IMPROVEMENTS TO PROVIDE 35% ENERGY REDUCTION

The developer is proposing the following measures to improve the energy performance of the building:

Be Lean

- ⌘ Walls: 0.18 W/m²K
- ⌘ Glazing: 1.40 W/m²K
- ⌘ Roof: 0.13 W/m²K
- ⌘ Floor: 0.13 W/m²K
- ⌘ Air tightness: 5m³/hrm²

Be Clean

As shown on the map below there are no exiting or proposed heat networks in the locality of the proposed development.



Figure 2. Local area heat map

Be Green

Renewable energy sources:

- ⌘ Air source heat pump.

Table 4 below shows the percentage reduction in energy usage following the proposed heating and fabric improvements.

Block	Dwelling Emission Rate (DER)	Target Emission Rate (TER)	Reduction
Block A	18.49	51.62	64.18%
Block B	18.89	51.62	64.18%

Block	Dwelling Emission Rate (DER)	Target Emission Rate (TER)	Reduction
Block C	36.48	94.79	61.51%
Block D	46.12	118.48	61.07%
Total	119.98	316.51	62.09%

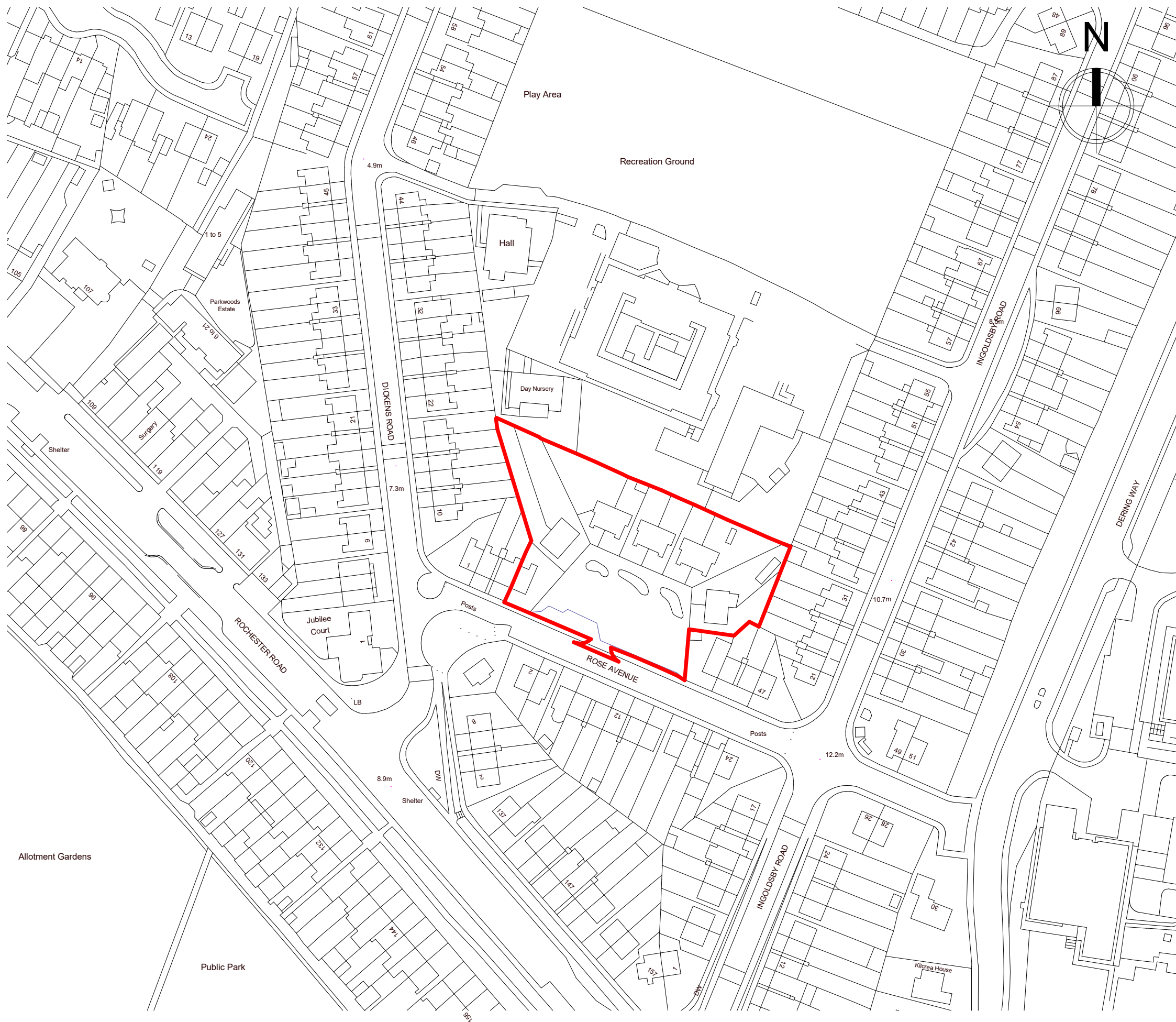
Table 4. Actual building energy reduction

As can be seen from Table 4, this development is exceeding the target of a 35% energy reduction by achieving a 62.09% reduction in predicted emissions with the 'Be Green' scenario.

With its fabric first approach and use of LZC technologies, this proposed development promotes the goals of the Gravesham Borough Council in it's ability to reduce heat demand, and then meet that demand by the most efficient means. The concentration on improving the fabric of the design to exceed best practice for the current times will not only help in the short term by reducing energy demands and CO₂ emissions now, but also allows the building to be future proofed and net-zero ready to meet further targets and needs that may be required in years to come.

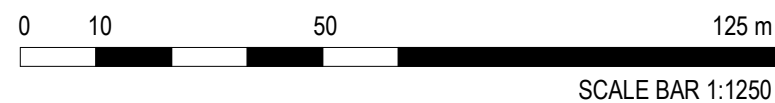
APPENDICES

APPENDIX A. ARCHITECTURAL FLOOR PLANS



1 Location Plan

Site Boundary



SCALE BAR 1:1250

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146-148 ELTHAM HILL
LONDON SE9 5DY
t: 020 8294 1000
e. general@baillygarner.co.uk

CLIENT



Civic Centre
Windmill Street, Gravesend
Gravesham DA12 1AU

t: 0147 433 7000
e:

PROJECT ADDRESS

Rose Avenue
Gravesend
DA12 2LN

PROJECT NAME

Rose Avenue

DRAWING TITLE

Site Location Plan

SUITABILITY CODE

Planning

SCALE	DRAWN	CHECKED	APPROVED	DATE

1.1250@A3	KS	RP	DB	01/08/25

PROJ NO	AUTHOR	VOLUME	LEVEL	DOCTYP	ROLE	DRW NO	REV NO

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A3



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A1

- Notes**
- All heights are in 'mm' Above Ordnance Datum (AOD)
- For more detailed information on landscape please refer to Landscape Architects drawings submitted alongside this application. Level information provided by topographical survey and landscape architect.
- Key**
- Site boundary (0.41ha)
 - Existing trees
 - Proposed trees
 - Trees to be removed
 - External Cycle Store
 - External Bin Store
 - Existing 'Home Zone' - alterations to suit proposed development
 - EV Charging Point
 - Proposed Level
 - Existing Level

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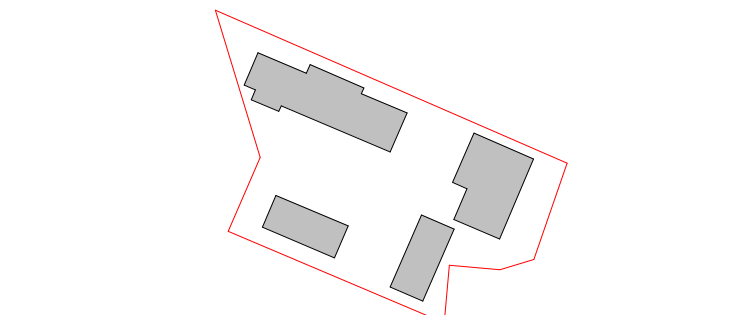
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145-148 ELTHAM HILL
LONDON SE8 5DY
t: 020 826 1000
e: general@bailygarner.co.uk

CLIENT



Gravesham
Borough Council

Civic Centre
Windmill Street, Gravesend
Gravesham DA12 1AU
t: 0147 423 7000
e:



PROJECT ADDRESS

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Gravesend
DA12 2LN

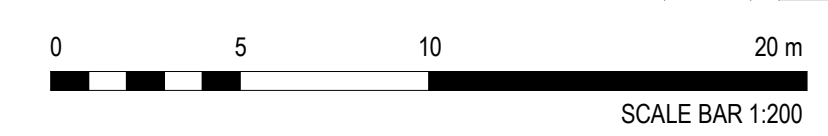
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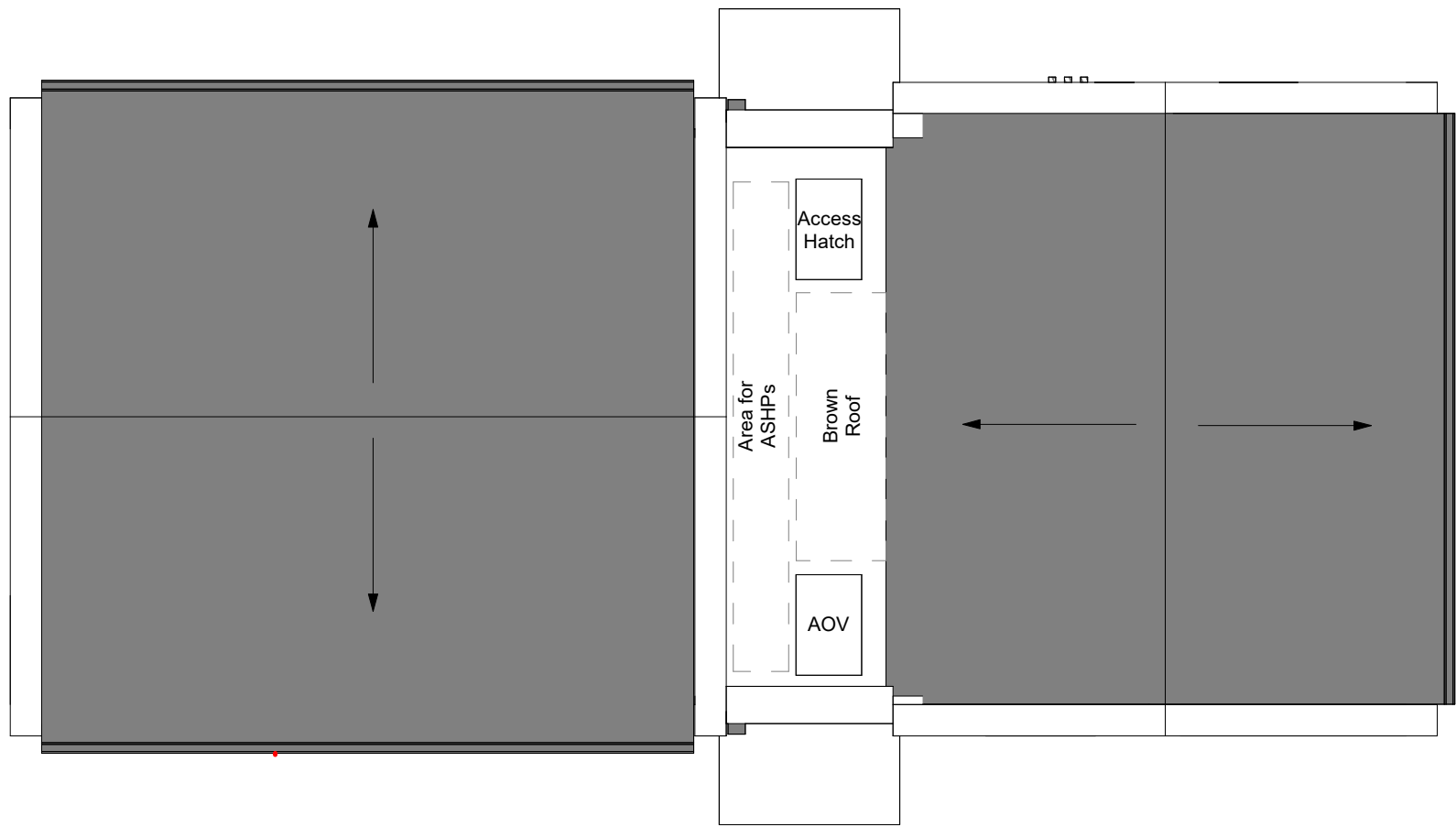
Proposed Site Plan

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Planning									
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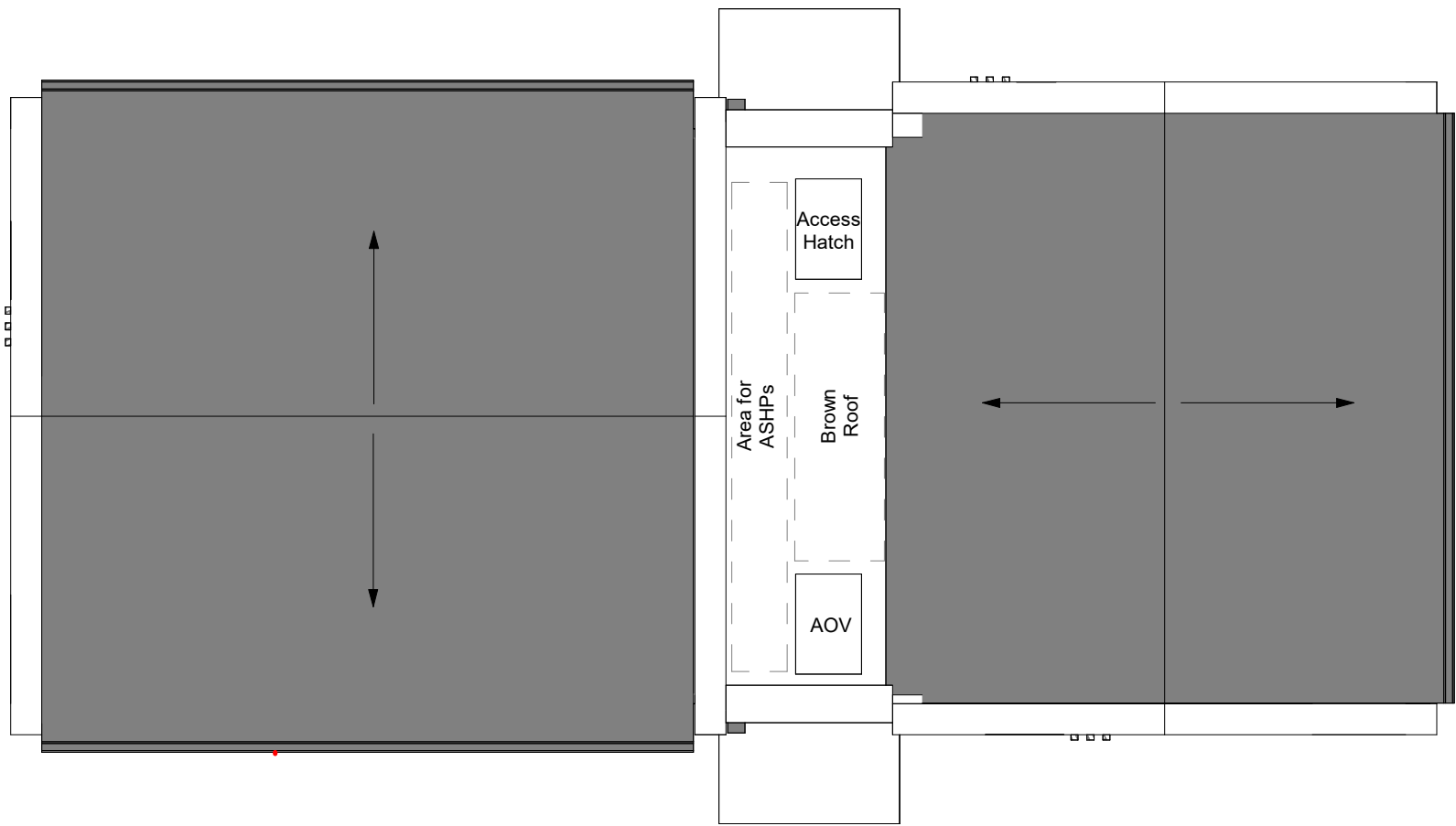


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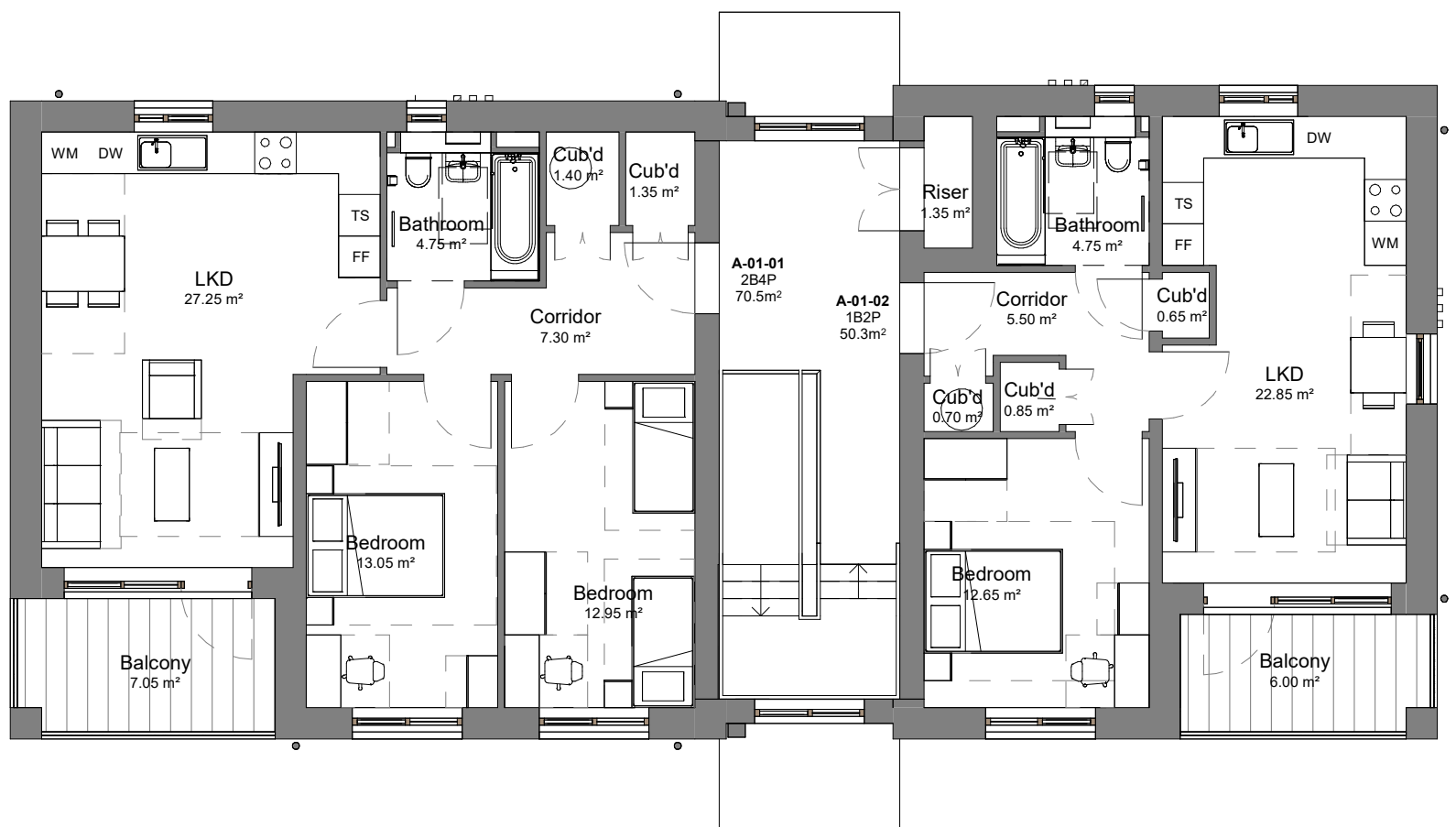
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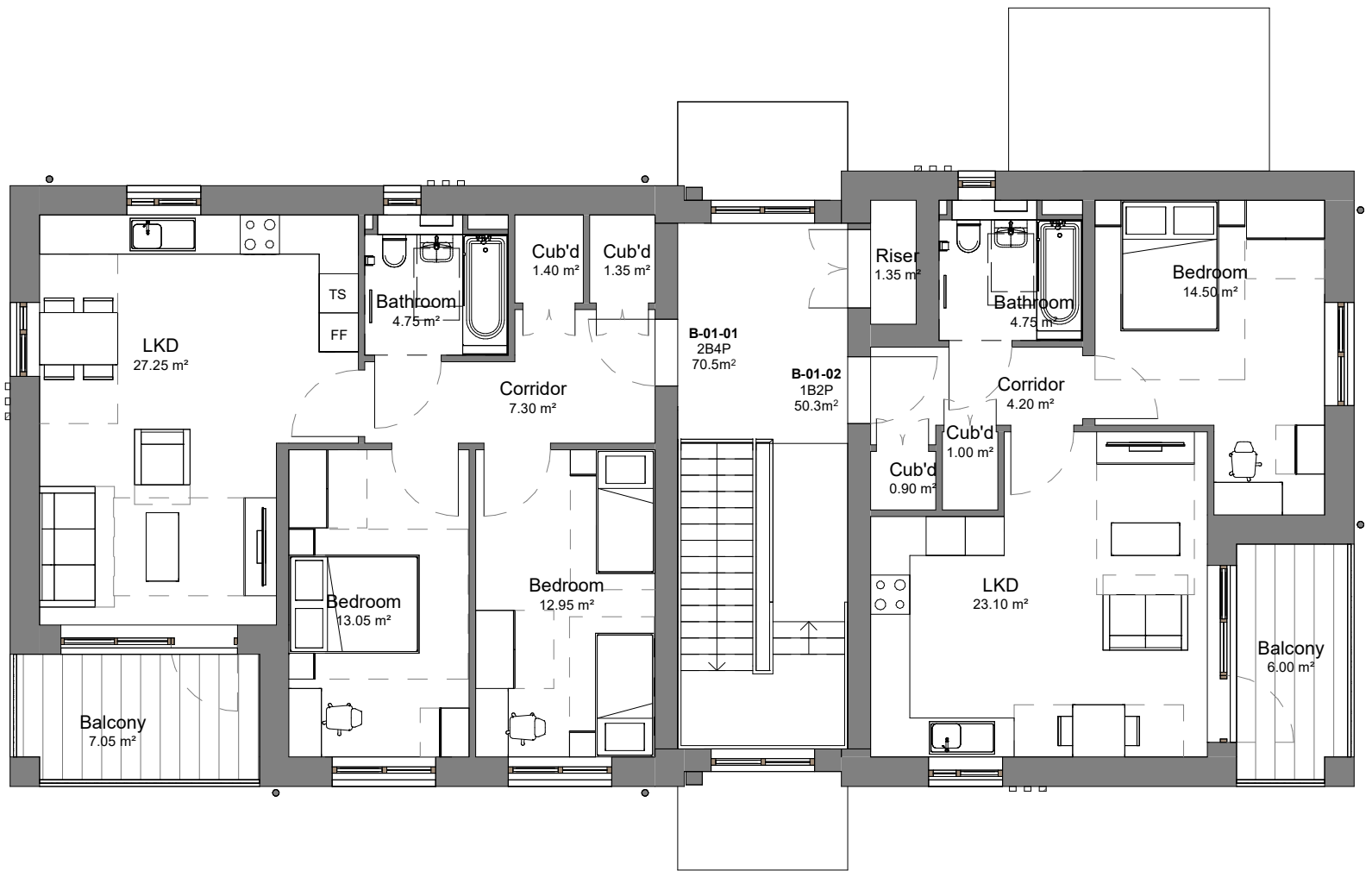
3 Block A - Roof Plan
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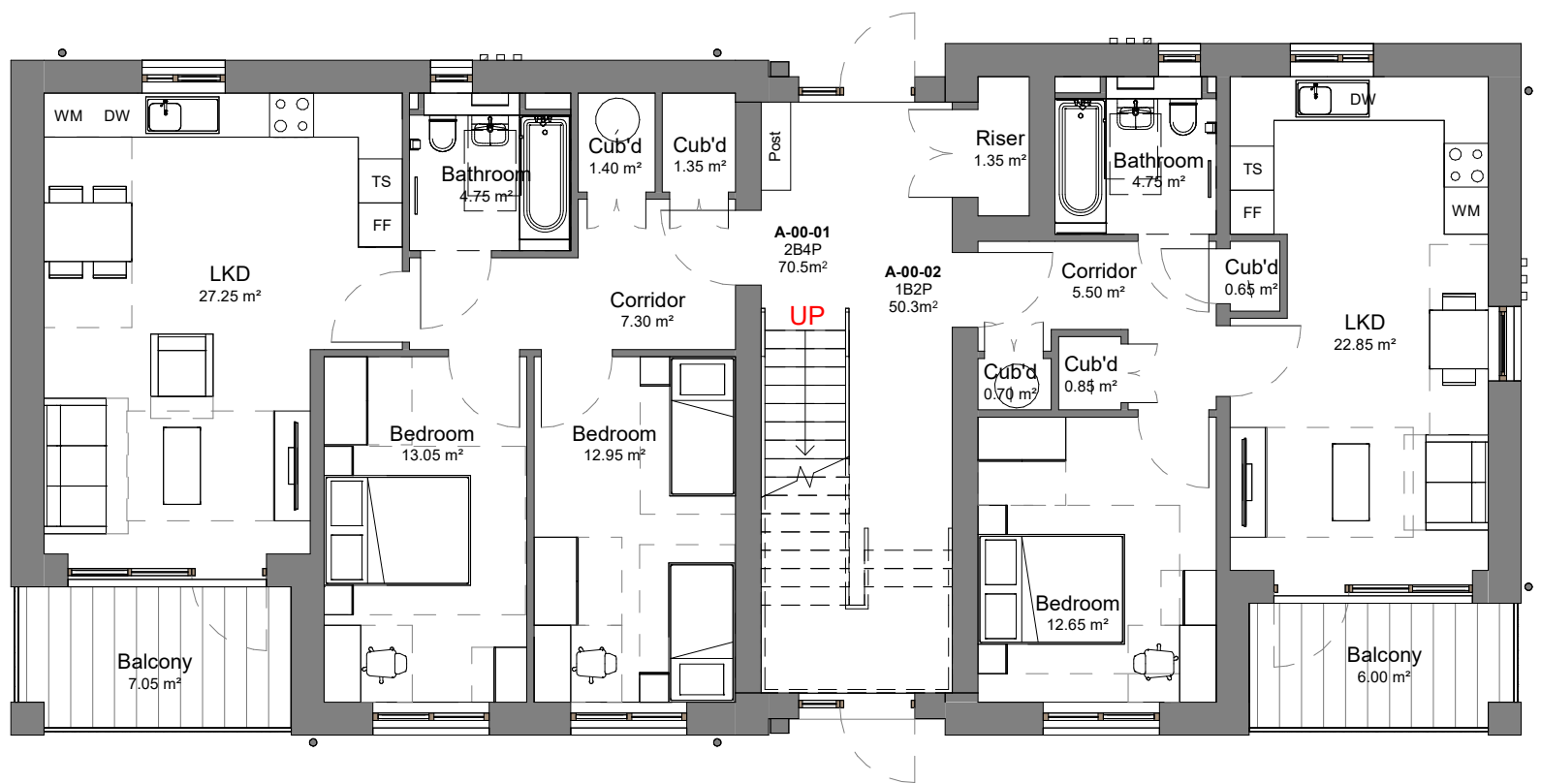
6 Block B - Roof Plan
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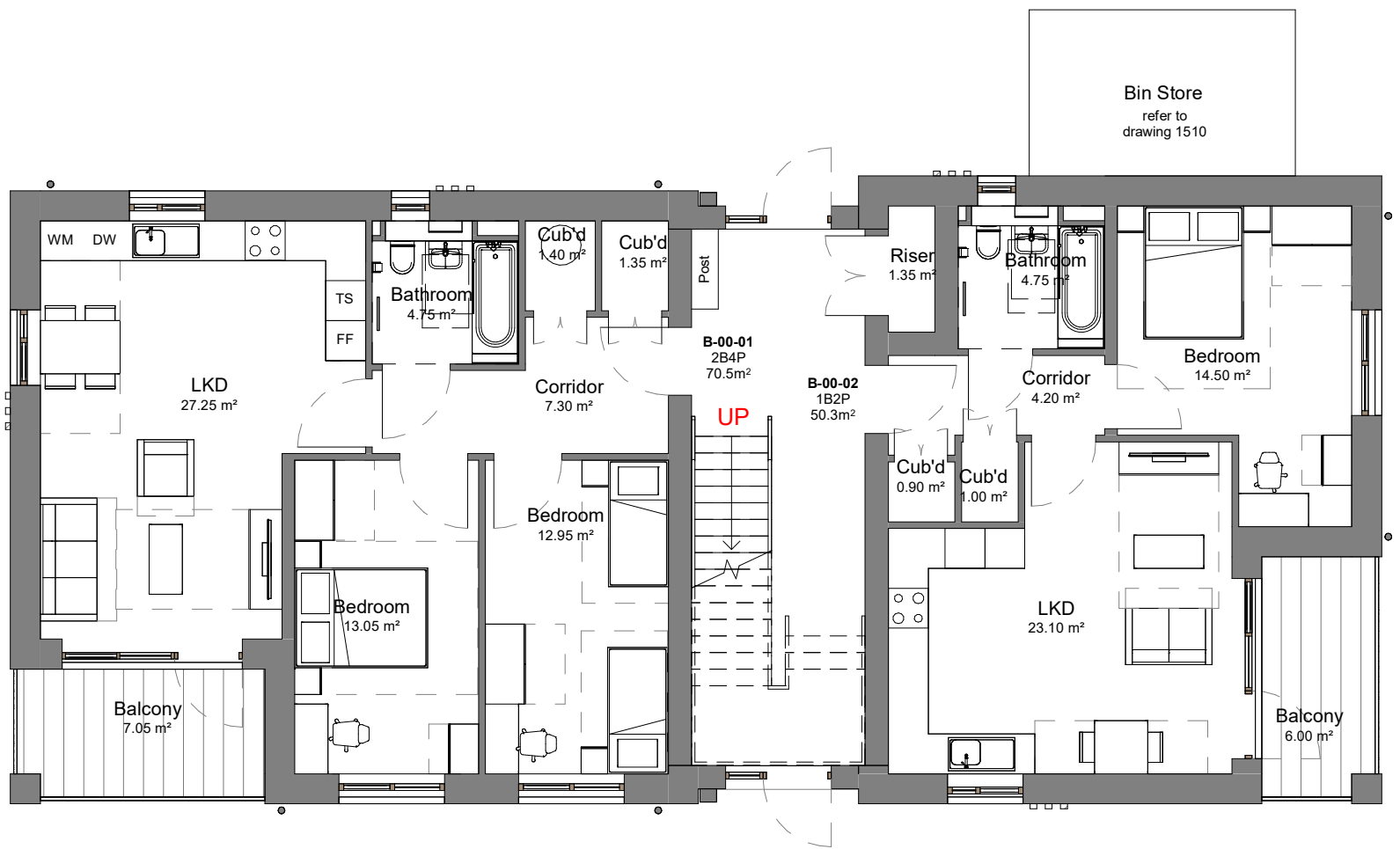
2 Block A - First Floor
1 : 100



5 Block B - First Floor
1 : 100



1 Block A - Ground Floor
1 : 100



4 Block B - Ground Floor
1 : 100

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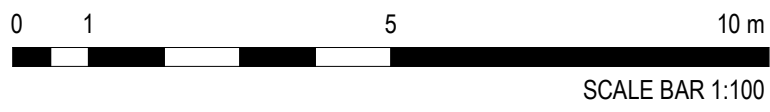
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DA12 2LN

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DRAWING TITLE
Proposed Floor Plans - Blocks A & B

SUITABILITY CODE	Planning
SCALE	1:100@A1
DRAWN	KS
CHECKED	RP
APPROVED	DB
DATE	01/08/25
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AUTHOR	BGL
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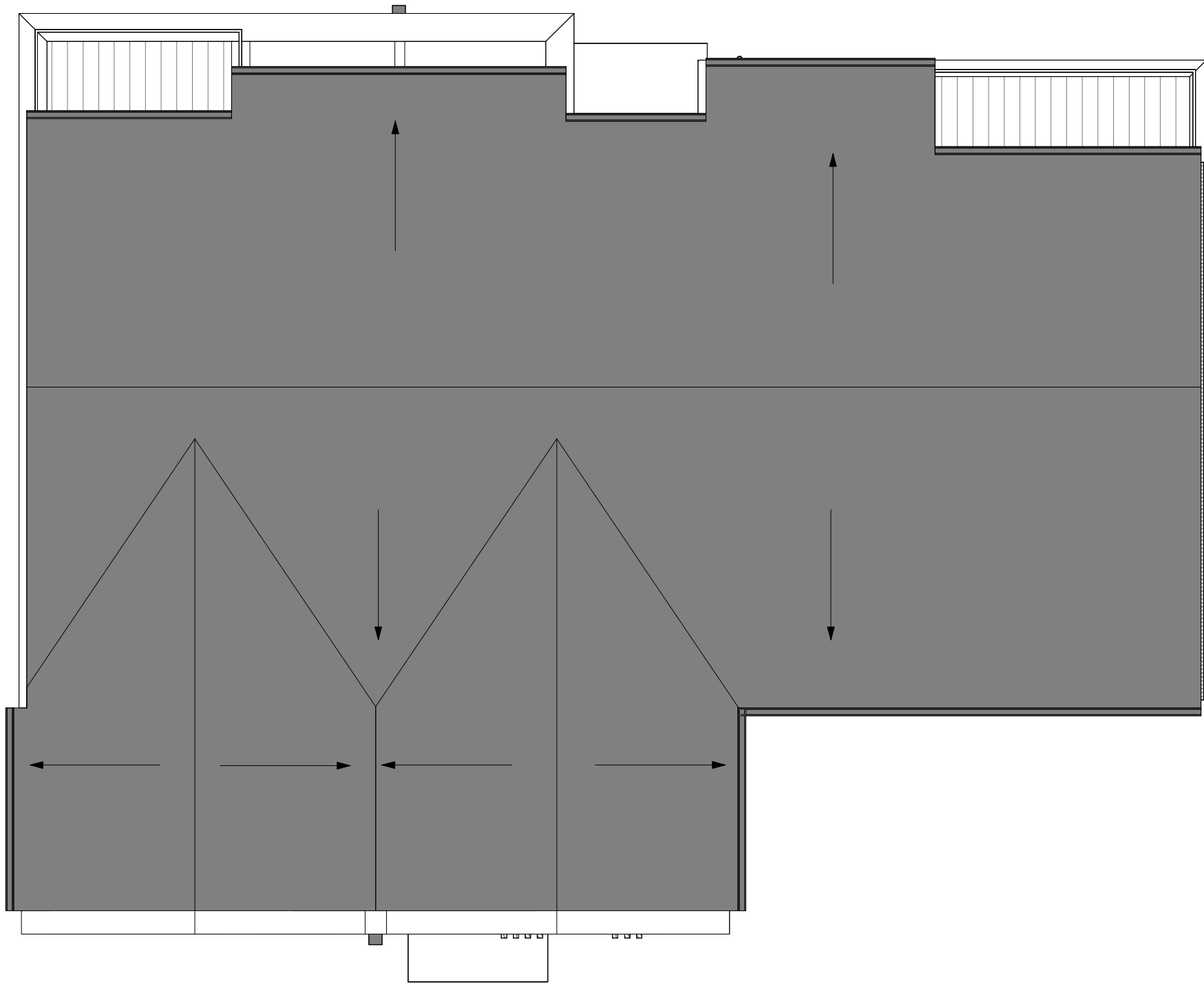


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A1



2 Block C - First Floor
1 : 100



4 Block C - Roof Plan
1 : 100



1 Block C - Ground Floor
1 : 100

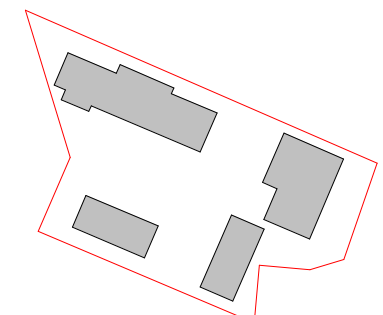


3 Block C - Second Floor
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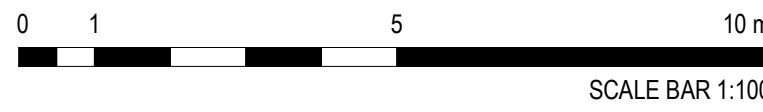


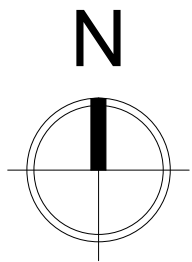
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Proposed Floor Plans - Block C

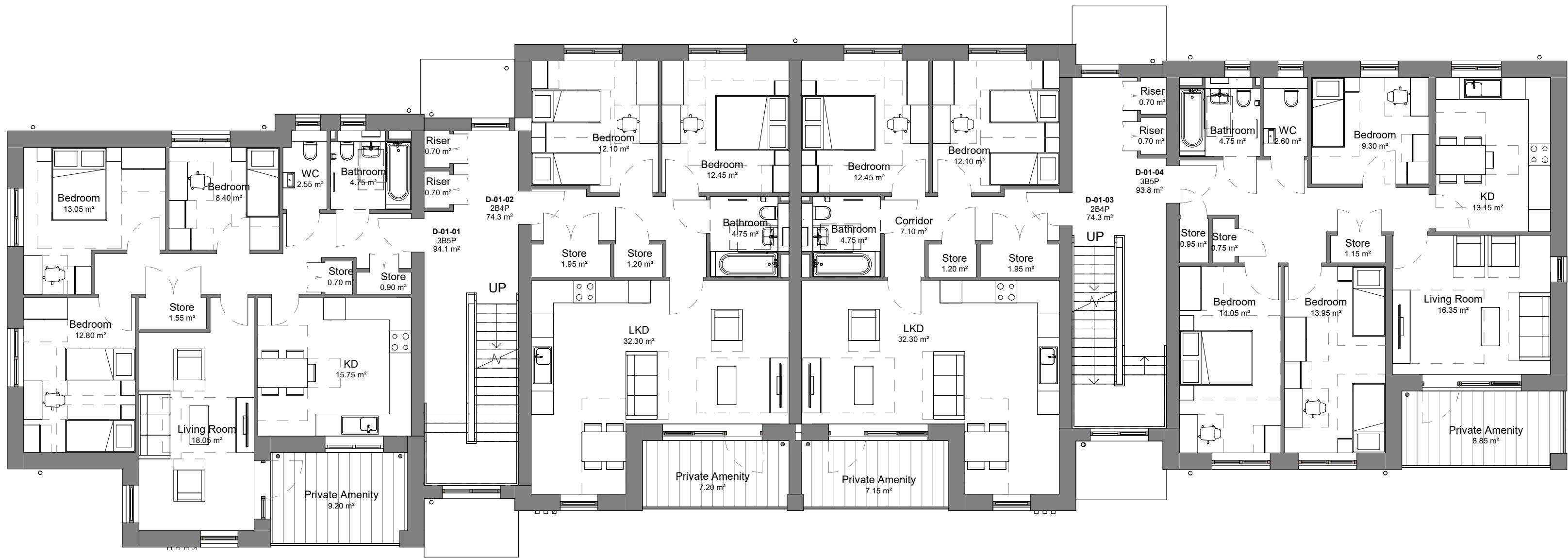
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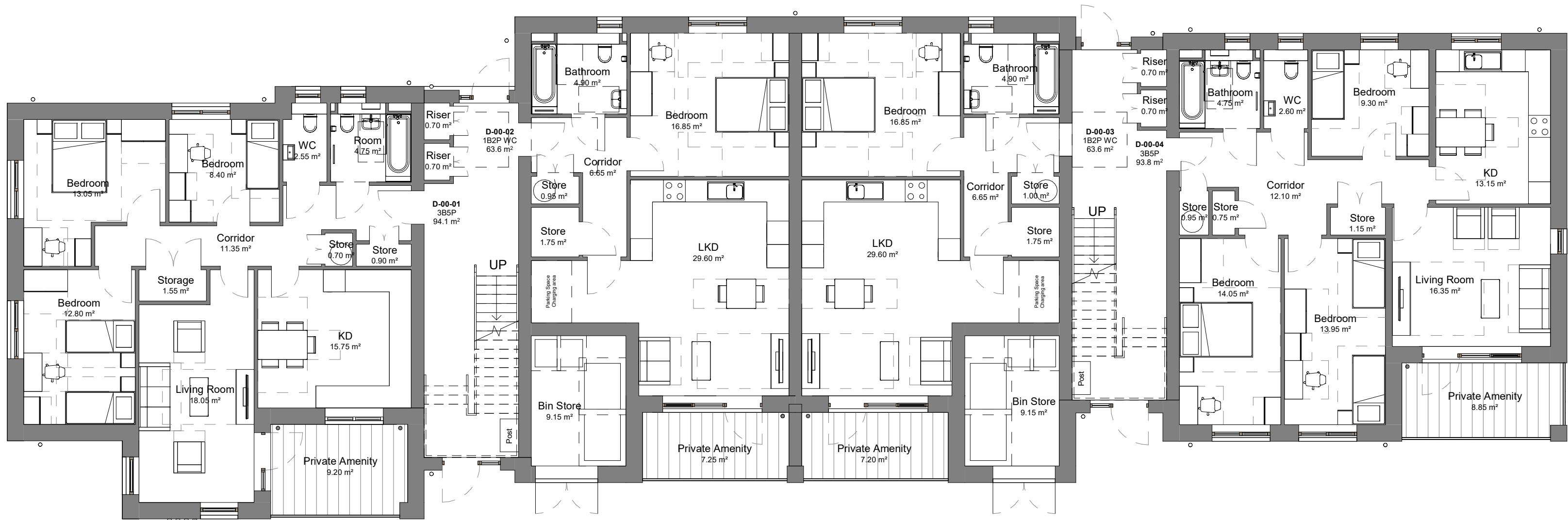


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A1



2 Block D - First Floor
1 : 100



1 Block D - Ground Floor Plan
1 : 100

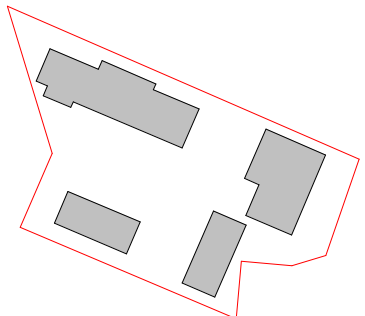
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LONDON SE8 5DY
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e: general@ballygarner.co.uk



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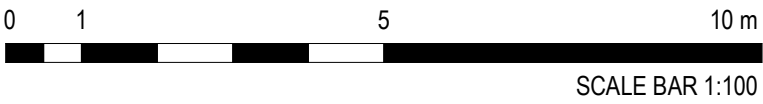
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Gravesham
DA12 2LN

PROJECT NAME
Rose Avenue

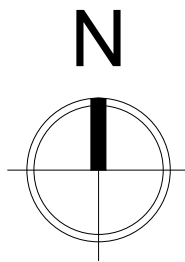
DRAWING TITLE
Proposed Floor Plans - Block D

SUITABILITY CODE
Planning

SCALE	DRAWN	CHECKED	APPROVED	DATE
1:100	KS	RP	DB	01/08/25
PROJ NO	AUTHOR	VOLUME	LEVEL	DOCTYP
35404	BGL	A1	XX	DR
ROLE	DRW NO	REV NO		
A	1203	P01		

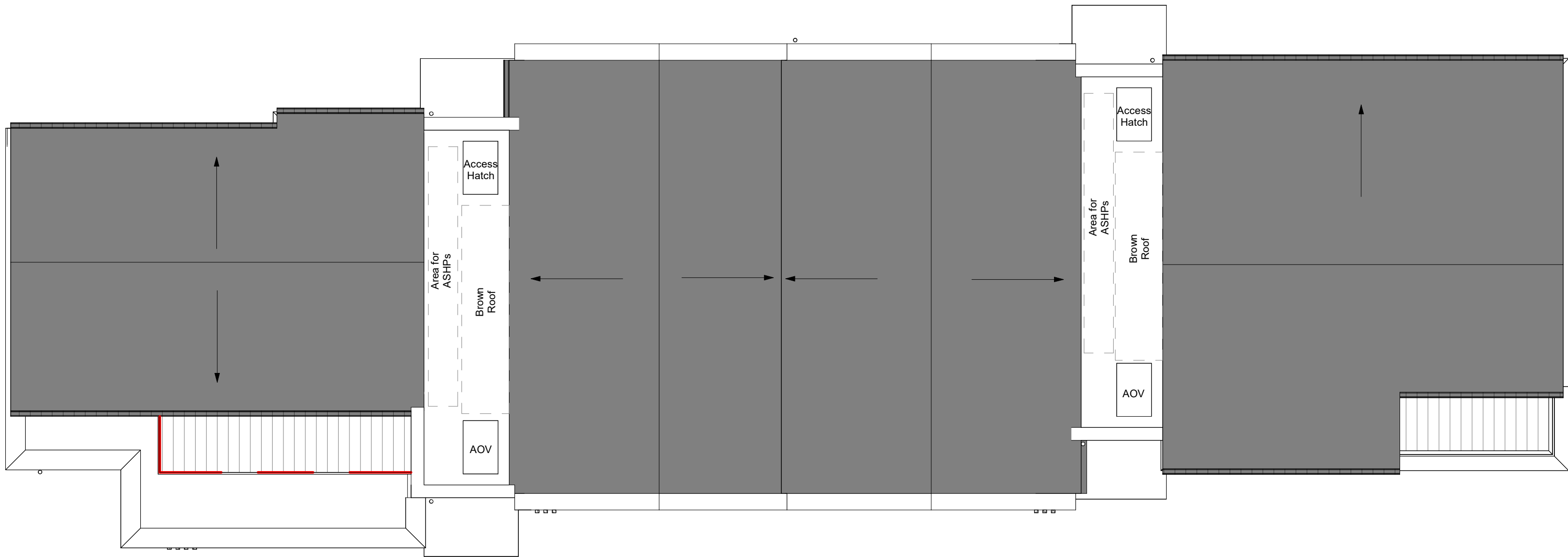


SCALE BAR 1:100

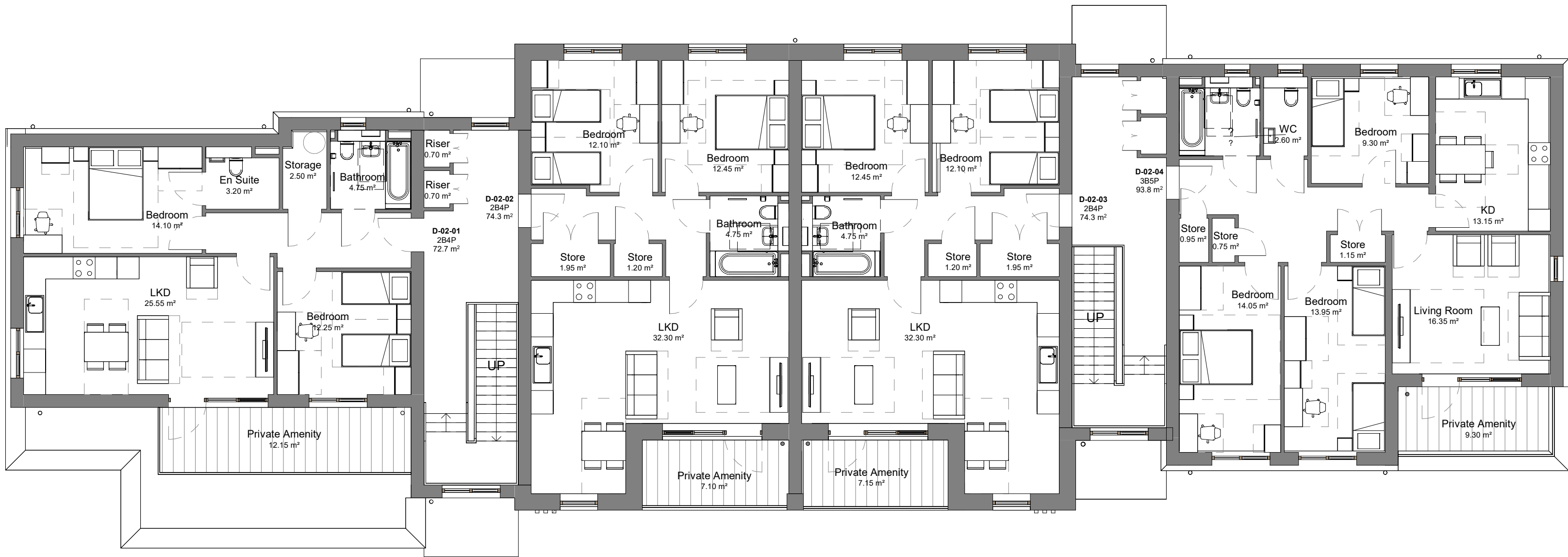


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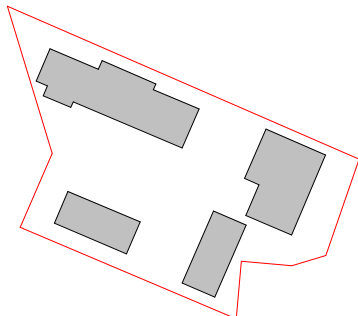


2 Block D - Roof Plan
1 : 100



1 Block D - Second Floor
1 : 100

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Rev	Description	Date

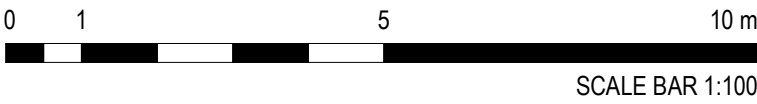


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DRAWING TITLE
Proposed Floor Plans - Block D

SUITABILITY CODE									
Planning									
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1:100	KS	RP	DB	01/08/25					
PROJ NO	AUTHOR	VOLUME	LEVEL	DOCTYP	ROLE	DRW NO	REV NO		
35404	BGL	A1	XX	DR	A	1204	P01		



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Notes

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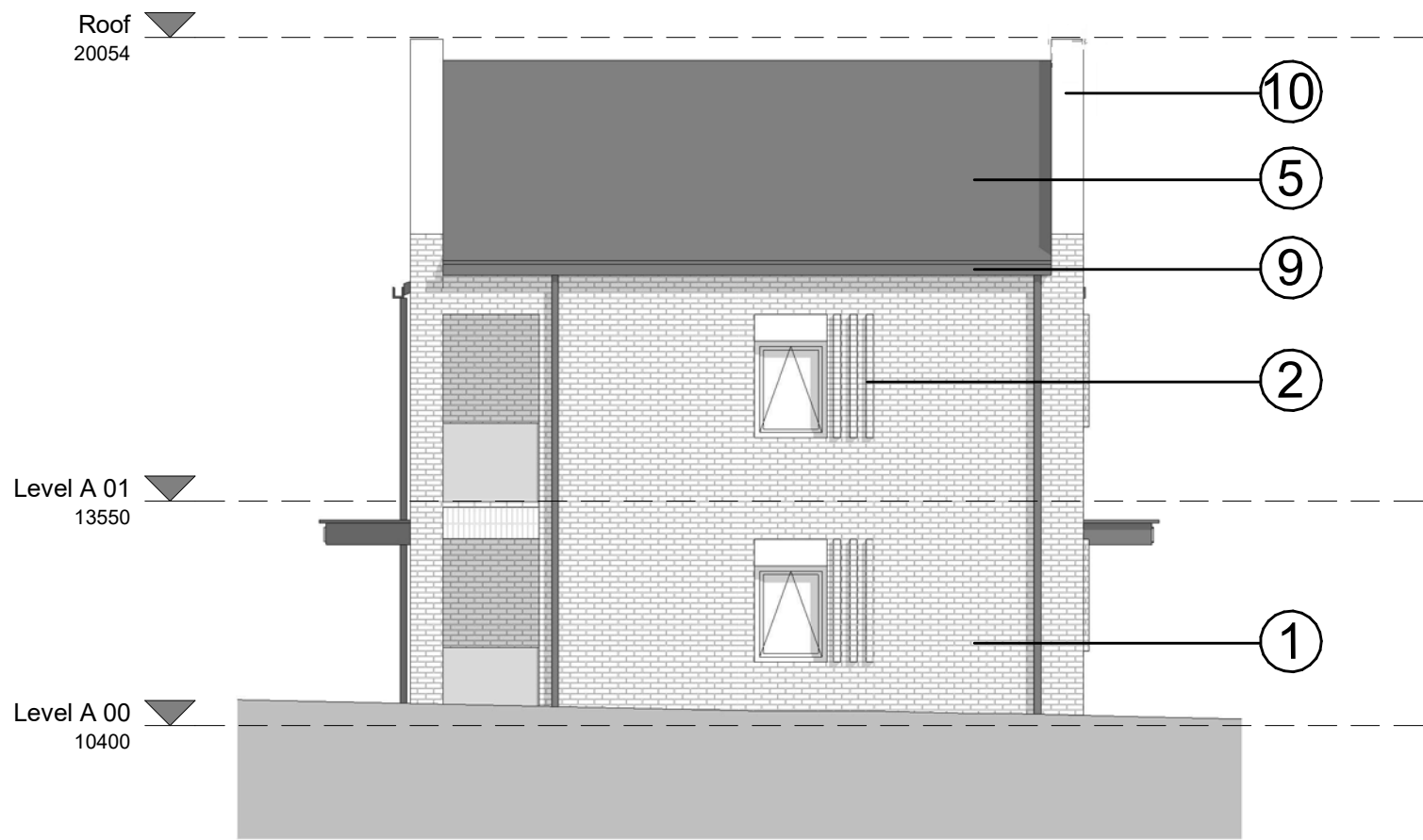
Material Key

- 1 Facing Brick - Light grey stock
- 2 Brick Detail - Protruding brick - Light grey stock
- 3 Brick Detail - Soldier course - Light grey stock
- 4 Concrete Lintel - Light buff
- 5 Zinc Cladding - Dark grey
- 6 Metal Balustrade - perforated dark grey
- 7 Window Screen - perforated dark grey
- 8 Windows & Doors - uPVC dark grey
- 9 Rainwater Goods - dark grey
- 10 Stone coping - light buff

1 **Block A - South Elevation**
1 : 100



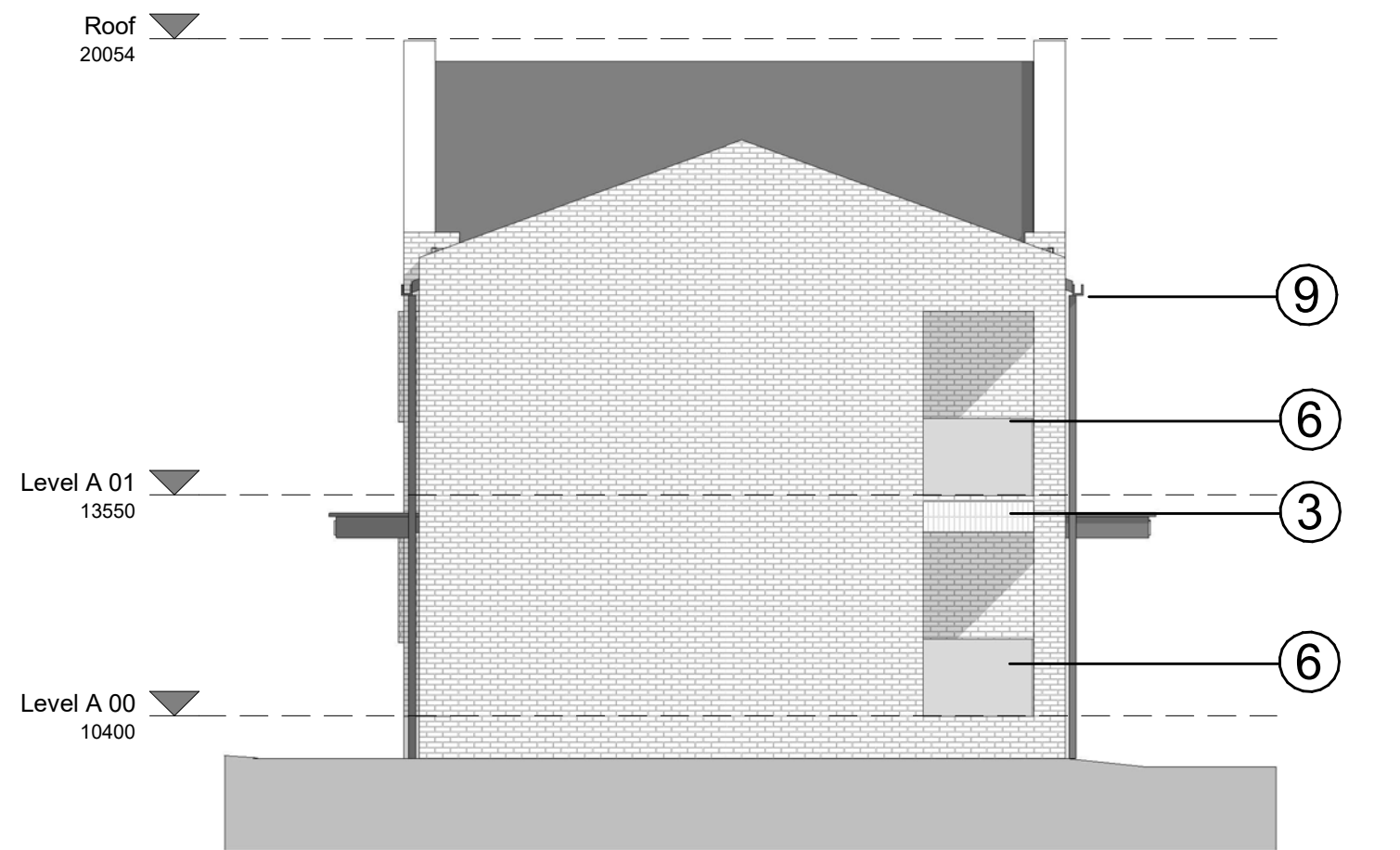
2 **Block A - East Elevation**
1 : 100



3 **Block A - North Elevation**
1 : 100



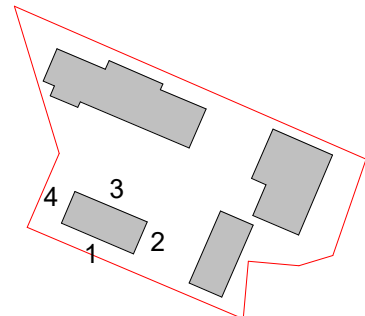
4 **Block A - West Elevation**
1 : 100



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DRAWING TITLE

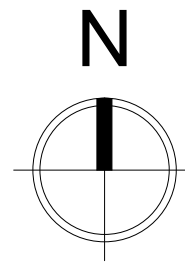
Proposed Elevations - Block A

SUITABILITY CODE

Planning

SCALE	DRAWN	CHECKED	APPROVED	DATE
1:100@A1	KS	RP	DB	01/08/25
PROJ NO	AUTHOR	VOLUME	LEVEL	DOCTYP
35404	BGL	A1	XX	DR
ROLE	DRW NO	REV NO		
A	1410	P01		



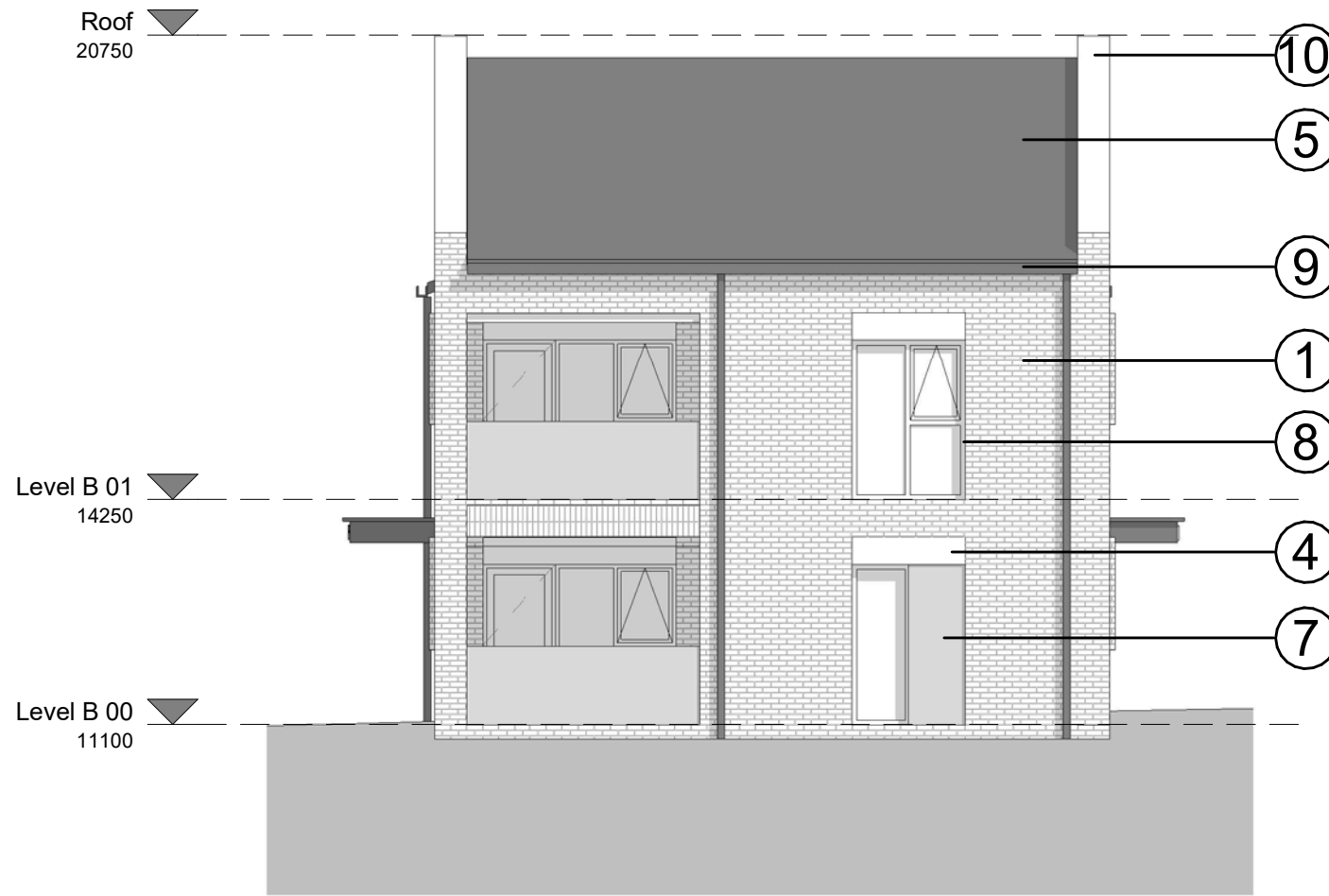


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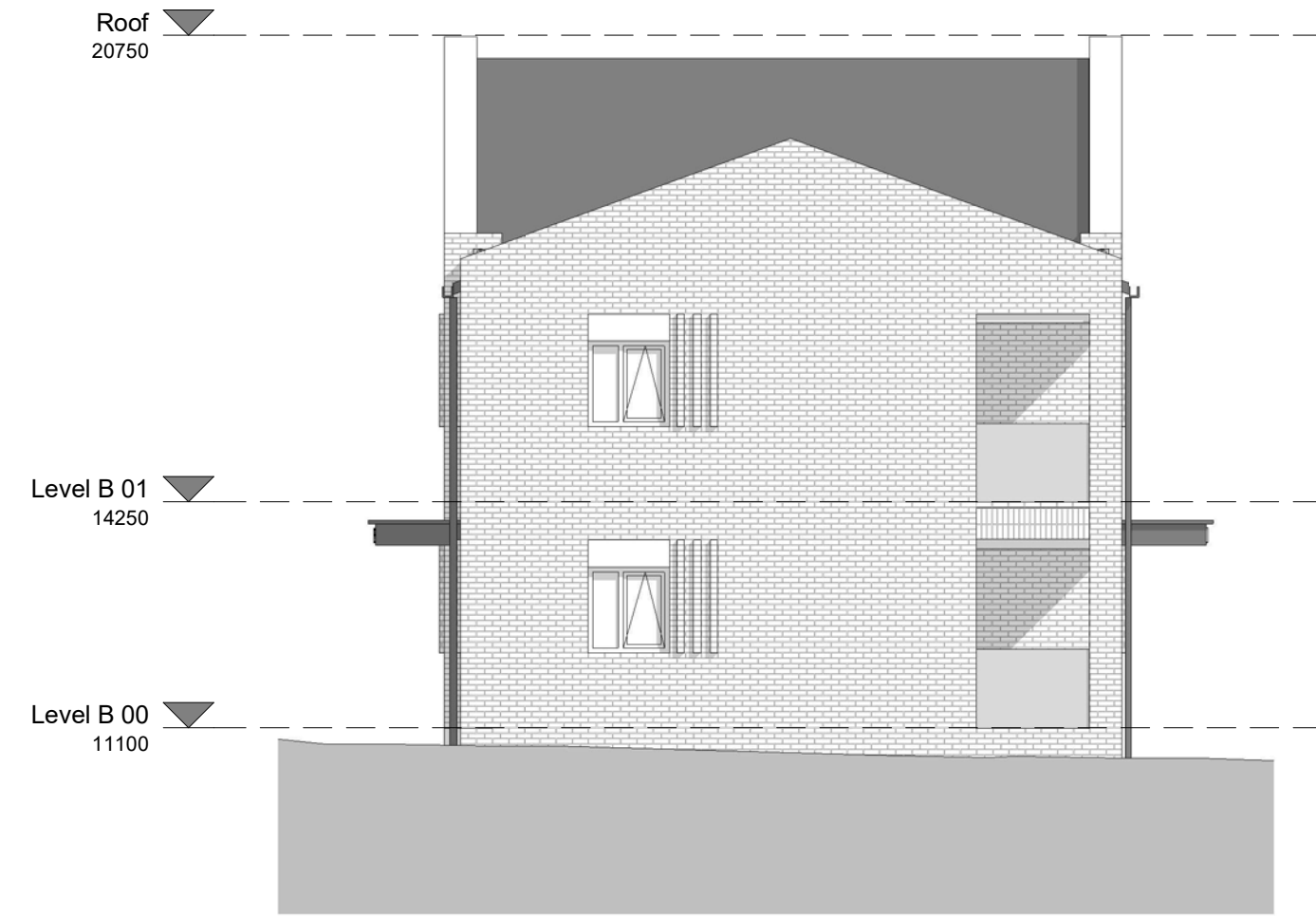
1 Block B - West Elevation
1 : 100



2 Block B - South Elevation
1 : 100



3 Block B - East Elevation
1 : 100



4 Block B - North Elevation
1 : 100

Notes

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Material Key

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- 7 Window Screen - perforated dark grey
- 8 Windows & Doors - uPVC dark grey
- 9 Rainwater Goods - dark grey
- 10 Stone coping - light buff

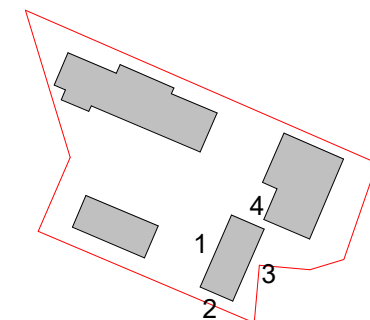
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145-148 ELTHAM HILL
LONDON SE8 5DY
t: 020 8284 1000
e: general@ballygarner.co.uk



CLIENT
Civic Centre
Windmill Street, Gravesend
Gravesend DA12 1AU
t: 0147 433 7000
e: info@gravesham.gov.uk



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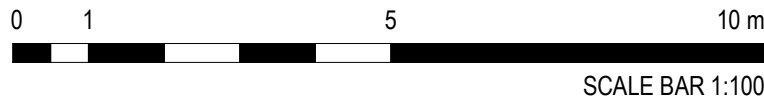
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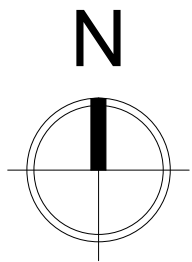
Proposed Elevations - Block B

SUITABILITY CODE

Planning

SCALE				DRAWN	CHECKED	APPROVED	DATE
1.100@A1				KS	RP	DB	01/08/25
PROJ NO	AUTHOR	VOLUME	LEVEL	DOCTYP	ROLE	DRW NO	REV NO
35404	BGL	A1	XX	DR	A	1411	P01





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Notes

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Material Key

- ① Facing Brick - Light grey stock
- ② Brick Detail - Protruding brick - Light grey stock
- ③ Brick Detail - Soldier course - Light grey stock
- ④ Concrete Lintel - Light buff
- ⑤ Zinc Cladding - Dark grey
- ⑥ Metal Balustrade - perforated dark grey
- ⑦ Window Screen - perforated dark grey
- ⑧ Windows & Doors - uPVC dark grey
- ⑨ Rainwater Goods - dark grey
- ⑩ Stone coping - light buff



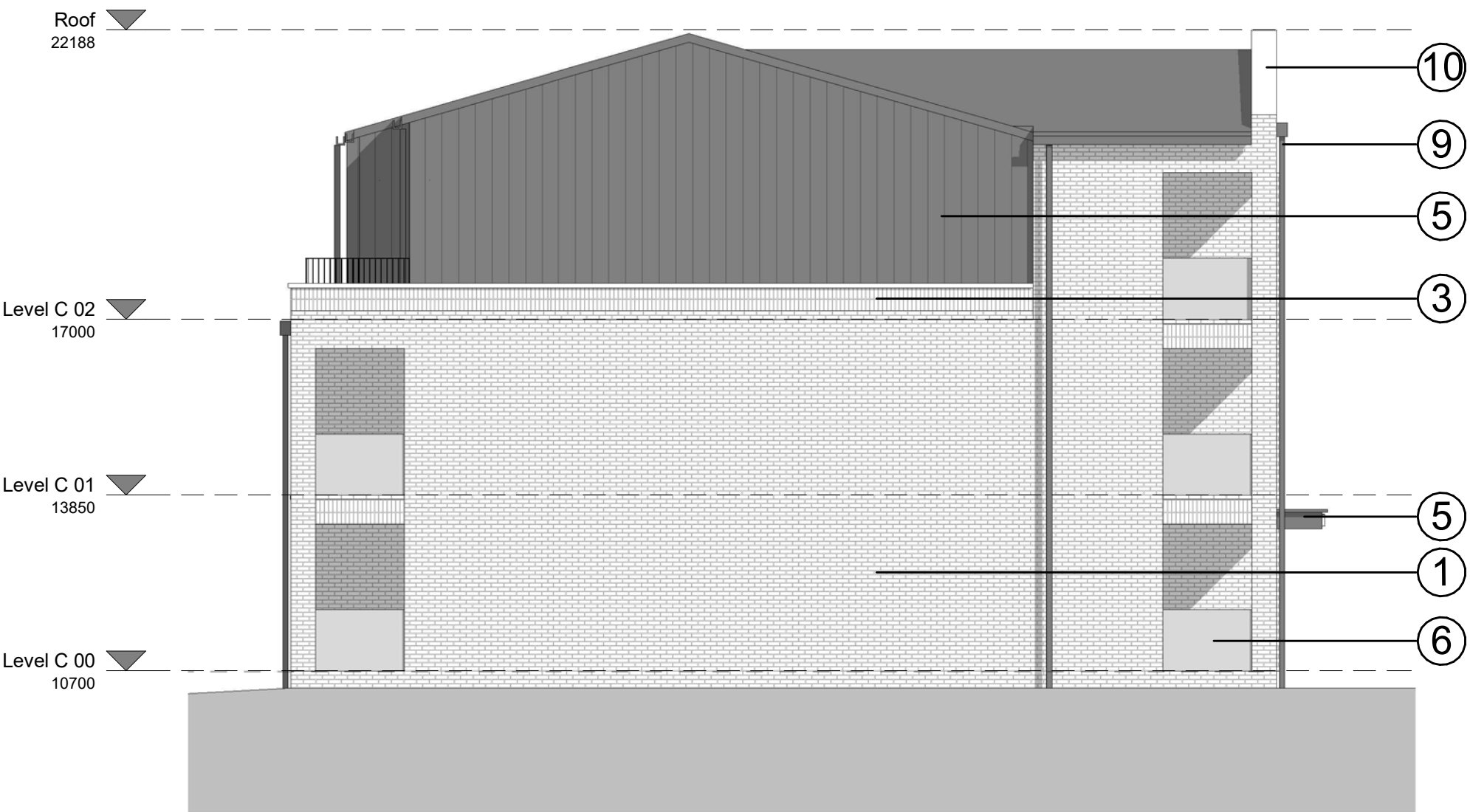
1. Block C - West Elevation
1 : 100



2. Block C - South Elevation
1 : 100



3. Block C - East Elevation
1 : 100



4. Block C - North Elevation
1 : 100

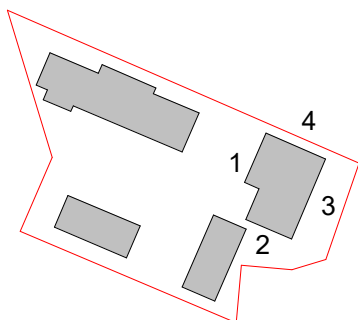
P01	Planning Submission	01/08/25
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LONDON SE8 5DY
t: 020 826 1000
e: general@bailygarner.co.uk



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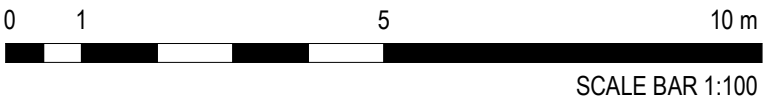
DRAWING TITLE

Proposed Elevations - Block C

SUITABILITY CODE

Planning

SCALE		DRAWN	CHECKED	APPROVED	DATE		
1.100@A1		KS	RP	DB	01/08/25		
PROJ NO	AUTHOR	VOLUME	LEVEL	DOCTYP	ROLE	DRW NO	REV NO
35404	BGL	A1	ZZ	DR	A	1412	P01



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Notes

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Material Key

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- 10 Stone coping - light buff



1 Block D - South Elevation
1 : 100



4 Block D - East Elevation
1 : 100

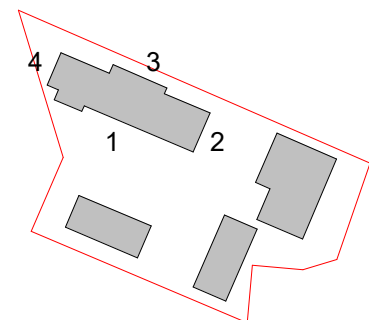


3 Block D - North Elevation
1 : 100



2 Block D - West Elevation
1 : 100

P01	Planning Submission	01/08/25
Rev	Description	Date



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PROJECT NAME

Rose Avenue

DRAWING TITLE

Proposed Elevations - Block D

SUITABILITY CODE

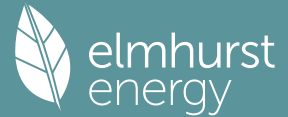
Planning

SCALE	DRAWN	CHECKED	APPROVED	DATE
1:100@A1	KS	RP	DB	01/08/25
PROJ NO	AUTHOR	VOLUME	LEVEL	DOCTYP
35404	BGL	A1	XX	DR
ROLE	DRW NO	REV NO		
A	1413	P01		



APPENDIX B. SAP CALCULATION OUTPUTS

Full SAP Calculation Printout



Property Reference	Block A Flat 1				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	82 B	DER	4.53	TER	11.73	
Environmental	96 A	% DER < TER				61.38
CO ₂ Emissions (t/year)	0.29	DFEE	33.23	TFEE	35.76	
Compliance Check	See BREL	% DFEE < TFEE				7.10
% DPER < TPER	21.55	DPER	48.04	TPER	61.24	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		
Dwelling volume			

2. Ventilation rate

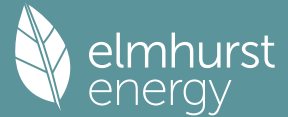
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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	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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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											
Opening Type 1			13.1000	1.3258	17.3674			(27)			
Heatloss Floor 1			70.0000	0.1300	9.1000	110.0000	7700.0000	(28a)			
External Wall 1	72.8000	13.1000	59.7000	0.1800	10.7460	190.0000	11342.9995	(29a)			
Total net area of external elements Aum(A, m2)			142.8000					(31)			
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	37.2134			(33)			
Main dwelling											
Party Ceiling 1			70.0000			20.0000	1400.0000	(32b)			
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		20442.9995	(34)			
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							292.0428	(35)			
List of Thermal Bridges											
K1 Element					Length	Psi-value	Total				
E5 Ground floor (normal)					28.0000	0.0000	0.0000				
E16 Corner (normal)					10.4000	0.0000	0.0000				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								0.0000 (36)			
Point Thermal bridges							(36a) =	0.0000			
Total fabric heat loss						(33) + (36) + (36a) =		37.2134 (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

Full SAP Calculation Printout



(38)m	31.4408	31.3860	31.3323	31.0801	31.0329	30.8132	30.8132	30.7726	30.8979	31.0329	31.1284	31.2282 (38)
Heat transfer coeff	68.6542	68.5995	68.5458	68.2935	68.2464	68.0267	68.0267	67.9860	68.1113	68.2464	68.3418	68.4416 (39)
Average = Sum(39)m / 12 =												68.2933
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9808	0.9800	0.9792	0.9756	0.9749	0.9718	0.9718	0.9712	0.9730	0.9749	0.9763	0.9777 (40)
HLP (average)												0.9756
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	26.1376	25.7430	25.1817	24.3411	23.5836	22.5407	21.7495	22.7170	23.2247	24.2581	25.3324	26.1169	(42b)
Hot water usage for other uses	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326	(42c)
Average daily hot water use (litres/day)													58.4472 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	63.7702	62.0071	60.0774	57.8683	55.7423	53.3310	52.5398	54.8757	56.7519	59.1537	61.5965	63.7494	(44)
Energy conte	93.8807	82.0480	85.8493	75.5905	71.8296	61.6755	58.0580	64.5897	65.8294	76.2256	83.2498	93.6207	(45)
Energy content (annual)										Total = Sum(45)m =			912.4468
Distribution loss (46)m = 0.15 x (45)m	14.0821	12.3072	12.8774	11.3386	10.7744	9.2513	8.7087	9.6885	9.8744	11.4338	12.4875	14.0431	(46)
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8600 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	(64)
										Total per year (kWh/year) = Sum(64)m =			1552.9488 (64)
12Total per year (kWh/year)													1553 (64)
Electric shower(s)	49.5554	44.1543	48.2148	46.0108	46.8741	44.7134	46.2038	46.8741	46.0108	48.2148	47.3081	49.5554	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =			563.6896 (64a)
Heat gains from water heating, kWh/month	87.1232	77.6270	84.1176	78.7517	79.1209	73.8006	74.3743	76.7137	75.5062	80.9177	81.6228	87.0368	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(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)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Water heating gains (Table 5)	117.1011	115.5164	113.0613	109.3774	106.3453	102.5009	99.9654	103.1098	104.8697	108.7604	113.3650	116.9849	(72)
Total internal gains	472.1333	483.4221	464.9817	453.6826	433.4179	419.9110	405.3021	406.3991	416.6863	428.1923	450.0294	463.3119	(73)

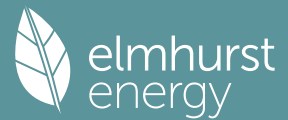
6. Solar gains

[Jan]												Gains
				Area	Solar flux		g		FF	Access		
				m2	Table 6a		Specific data		Specific data	factor		
					W/m2		or Table 6b		or Table 6c	Table 6d		W
Northeast				6.2000		11.2829		0.3500		0.0000	0.7700	18.8527 (75)
Southeast				2.1000		36.7938		0.3500		0.0000	0.7700	20.8235 (77)
Northwest				4.8000		11.2829		0.3500		0.0000	0.7700	14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	526.4051	586.9771	636.1808	715.2708	771.5672	775.4744	739.8386	680.7815	618.7081	550.5994	517.0577	508.4480 (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 from living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	82.7132	82.7792	82.8441	83.1500	83.2075	83.4762	83.4762	83.5262	83.3725	83.2075	83.0913	82.9701	
alpha	6.5142	6.5186	6.5229	6.5433	6.5472	6.5651	6.5651	6.5684	6.5582	6.5472	6.5394	6.5313	
util living area	0.9966	0.9923	0.9797	0.9212	0.7699	0.5558	0.4039	0.4579	0.7252	0.9501	0.9914	0.9973	(86)

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Living	20.1359	20.2746	20.4849	20.7672	20.9434	20.9939	20.9993	20.9986	20.9704	20.7404	20.3919	20.1065
Non living	19.0996	19.2764	19.5411	19.8804	20.0621	20.1040	20.1067	20.1070	20.0887	19.8577	19.4287	19.0641
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	20.5579	20.2746	20.4849	20.7672	20.9434	20.9939	20.9993	20.9986	20.9704	20.7404	20.3919	20.2314 (87)
Th 2	20.0994	20.1000	20.1007	20.1037	20.1043	20.1069	20.1069	20.1074	20.1059	20.1043	20.1031	20.1019 (88)
util rest of house												
MIT 2	0.9953	0.9895	0.9722	0.8948	0.7127	0.4810	0.3223	0.3699	0.6456	0.9272	0.9877	0.9963 (89)
Living area fraction	19.7008	19.2764	19.5411	19.8804	20.0621	20.1040	20.1067	20.1070	20.0887	19.8577	19.4287	19.2511 (90)
MIT	20.0314	19.6614	19.9051	20.2224	20.4020	20.4472	20.4510	20.4509	20.4288	20.1982	19.8002	19.6292 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0314	19.6614	19.9051	20.2224	20.4020	20.4472	20.4510	20.4509	20.4288	20.1982	19.8002	19.6292 (93)

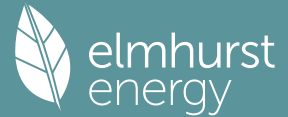
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9952	0.9878	0.9702	0.8987	0.7326	0.5098	0.3538	0.4039	0.6756	0.9300	0.9861	0.9956 (94)
Useful gains	523.8939	579.8043	617.1991	642.8211	565.2675	395.3326	261.7865	274.9723	417.9897	512.0518	509.8473	506.2113 (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	1080.0284	1012.6268	918.8620	773.2494	593.8819	397.7678	261.9720	275.4025	431.0624	655.0421	867.9555	1056.0021 (97)
Space heating kWh	413.7641	290.8567	224.4372	93.9084	21.2891	0.0000	0.0000	0.0000	0.0000	106.3848	257.8379	409.0444 (98a)
Space heating requirement - total per year (kWh/year)												1817.5226
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	413.7641	290.8567	224.4372	93.9084	21.2891	0.0000	0.0000	0.0000	0.0000	106.3848	257.8379	409.0444 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1817.5226
Space heating per m2										(98c) / (4) =		25.9646 (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 %)												306.0519 (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	413.7641	290.8567	224.4372	93.9084	21.2891	0.0000	0.0000	0.0000	0.0000	106.3848	257.8379	409.0444 (98)
Space heating efficiency (main heating system 1)	306.0519	306.0519	306.0519	306.0519	306.0519	0.0000	0.0000	0.0000	0.0000	306.0519	306.0519	306.0519 (210)
Space heating fuel (main heating system)	135.1941	95.0351	73.3331	30.6838	6.9560	0.0000	0.0000	0.0000	0.0000	34.7604	84.2465	133.6520 (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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195 (64)
Efficiency of water heater (217)m	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275 (216)
Fuel for water heating, kWh/month	80.1392	70.8989	75.7985	69.3056	68.2214	61.7851	60.7784	64.3086	64.0302	70.5973	73.4452	79.9987 (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	23.9244	19.1931	17.2812	12.6610	9.7797	7.9901	8.9214	11.5963	15.0625	19.7628	22.3220	24.5894 (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												593.8610 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												185.0275
Water heating fuel used												839.3070 (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)												193.0839 (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												2189.9415 (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	593.8610	0.1566	93.0021 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	839.3070	0.1404	117.8257 (264)
Energy for instantaneous electric shower(s)	563.6896	0.1391	78.4217 (264a)
Space and water heating			210.8278 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	193.0839	0.1443	27.8680 (268)
Total CO2, kg/year			317.1175 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5300 (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	593.8610	1.5798	938.1614 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	839.3070	1.5191	1274.9612 (278)
Energy for instantaneous electric shower(s)	563.6896	1.5143	853.6145 (278a)
Space and water heating			2213.1226 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	193.0839	1.5338	296.1585 (282)
Total Primary energy kWh/year			3362.8956 (286)
Dwelling Primary energy Rate (DPER)			48.0400 (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	70.0000 (1b)	x 2.6000 (2b)	= 182.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	182.0000 (5)

2. Ventilation rate

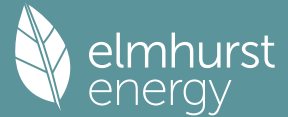
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1099 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3599 (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) = 0.3059 (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	0.3900	0.3824	0.3747	0.3365	0.3288	0.2906	0.2906	0.2830	0.3059	0.3288	0.3441	0.3594 (22b)
Effective ac	0.5761	0.5731	0.5702	0.5566	0.5541	0.5422	0.5422	0.5400	0.5468	0.5541	0.5592	0.5646 (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 Opening Type			13.1000	1.1450	15.0000		(27)
Heatloss Floor 1			70.0000	0.1300	9.1000		(28a)
External Wall 1	72.8000	13.1000	59.7000	0.1800	10.7460		(29a)
Total net area of external elements Aum (A, m2)			142.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		34.8460		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							302.0428 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000 0.0900 0.9360

5.4160 (36)
0.0000
(33) + (36) + (36a) = 40.2620 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 34.5983 34.4209 34.2470 33.4303 33.2775 32.5662 32.5662 32.4345 32.8402 33.2775 33.5866 33.9098 (38)
74.8603 74.6829 74.5090 73.6923 73.5395 72.8282 72.8282 72.6965 73.1022 73.5395 73.8486 74.1718 (39)
Average = Sum(39)m / 12 = 73.6916

HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 1.0694 1.0669 1.0644 1.0527 1.0506 1.0404 1.0404 1.0385 1.0443 1.0506 1.0550 1.0596 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.2461 (42)
Hot water usage for mixer showers 61.8798 60.9498 59.5947 57.0020 55.0887 52.9549 51.7420 53.0869 54.5611 56.8521 59.5005 61.6427 (42a)
Hot water usage for baths 26.7336 26.3365 25.7774 24.7465 23.9746 23.1187 22.6564 23.2116 23.8161 24.7319 25.7840 26.6432 (42b)
Hot water usage for other uses 37.6326 36.2641 34.8957 33.5272 32.1587 30.7903 30.7903 32.1587 33.5272 34.8957 36.2641 37.6326 (42c)
Average daily hot water use (litres/day) 116.0487 (43)

Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 126.2459 123.5505 120.2678 115.2758 111.2220 106.8639 105.1887 108.4572 111.9043 116.4797 121.5487 125.9184 (44)
Energy content (annual) 199.9426 175.9342 184.8472 157.8067 149.7262 131.4016 127.2166 134.2926 137.9892 158.0618 173.1684 197.1578 (45)
Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 1927.5450
29.9914 26.3901 27.7271 23.6710 22.4589 19.7102 19.0825 20.1439 20.6984 23.7093 25.9753 29.5737 (46)

Water storage loss:
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3938 (48)
Temperature factor from Table 2b 0.5400 (49)
Enter (49) or (54) in (55) 0.7527 (55)
Total storage loss 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (56)

If cylinder contains dedicated solar storage 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (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
246.5375 218.0199 231.4421 202.8986 196.3211 176.4934 173.8115 180.8875 183.0811 204.6567 218.2602 243.7527 (62)
WWHRS -28.2888 -25.0189 -26.1983 -21.6933 -20.2173 -17.3001 -16.2161 -17.8994 -21.1014 -23.9053 -27.7650 (63a)
PV diverter -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 (63b)
Solar input 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63c)
FGHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63d)

Output from w/h 218.2487 193.0011 205.2437 181.2053 176.1038 159.1933 157.5954 163.6433 165.1817 183.5553 194.3549 215.9878 (64)
Total per year (kWh/year) Total per year (kWh/year) = Sum(64)m = 2213.3143 (64)
2213 (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)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month
103.7568 92.1667 98.7376 88.5442 87.0599 79.7645 79.5754 81.9282 81.9549 89.8315 93.6520 102.8309 (65)

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

Metabolic gains (Table 5), Watts
(66)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 101.0433 111.8694 101.0433 104.4114 101.0433 104.4114 101.0433 101.0433 104.4114 101.0433 104.4114 101.0433 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 197.2971 199.3444 194.1852 183.2019 169.3374 156.3068 147.6015 145.5542 150.7134 161.6967 175.5612 188.5918 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 34.2306 34.2306 34.2306 34.2306 34.2306 34.2306 34.2306 34.2306 34.2306 34.2306 34.2306 34.2306 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -89.8450 -89.8450 -89.8450 -89.8450 -89.8450 -89.8450 -89.8450 -89.8450 -89.8450 -89.8450 -89.8450 -89.8450 (71)
Water heating gains (Table 5) 139.4581 137.1528 132.7118 122.9781 117.0160 110.7840 106.9562 110.1186 113.8262 120.7412 130.0722 138.2136 (72)
Total internal gains 497.4904 508.0585 487.6322 470.2832 447.0886 428.1941 412.2929 413.4079 425.6429 443.1731 469.7366 487.5406 (73)

6. Solar gains

[Jan] Area Solar flux g FF Access Gains
m2 Table 6a Specific data Specific data factor W
W/m2 or Table 6b or Table 6c Table 6d

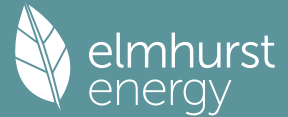
Northeast 6.2000 11.2829 0.6300 0.7000 0.7700 21.3789 (75)
Southeast 2.1000 36.7938 0.6300 0.7000 0.7700 23.6138 (77)
Northwest 4.8000 11.2829 0.6300 0.7000 0.7700 16.5514 (81)

Solar gains 61.5442 117.4314 194.1398 296.6411 383.4613 403.2089 379.3644 311.1496 229.0926 138.8097 76.0101 51.1843 (83)
Total gains 559.0345 625.4899 681.7720 766.9243 830.5499 831.4030 791.6573 724.5575 654.7355 581.9828 545.7467 538.7249 (84)

7. Mean internal temperature (heating season)

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

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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	78.4536	78.6399	78.8234	79.6970	79.8626	80.6426	80.6426	80.7887	80.3404	79.8626	79.5283	79.1818	
alpha	6.2302	6.2427	6.2549	6.3131	6.3242	6.3762	6.3762	6.3859	6.3560	6.3242	6.3019	6.2788	
util living area	0.9963	0.9918	0.9785	0.9191	0.7674	0.5544	0.4040	0.4597	0.7309	0.9509	0.9912	0.9971	(86)
MIT	20.0768	20.2246	20.4492	20.7506	20.9378	20.9931	20.9992	20.9983	20.9654	20.7176	20.3519	20.0544	(87)
Th 2	20.0259	20.0280	20.0300	20.0396	20.0414	20.0498	20.0498	20.0514	20.0466	20.0414	20.0378	20.0340	(88)
util rest of house	0.9949	0.9887	0.9702	0.8908	0.7067	0.4751	0.3172	0.3660	0.6466	0.9270	0.9872	0.9959	(89)
MIT 2	18.9645	19.1537	19.4372	19.8036	19.9960	20.0466	20.0496	20.0509	20.0270	19.7760	19.3241	18.9422	(90)
Living area fraction									FLA = Living area / (4) =			0.3857	(91)
MIT	19.3936	19.5668	19.8275	20.1689	20.3593	20.4117	20.4159	20.4163	20.3890	20.1392	19.7205	19.3712	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.3936	19.5668	19.8275	20.1689	20.3593	20.4117	20.4159	20.4163	20.3890	20.1392	19.7205	19.3712	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9937	0.9868	0.9681	0.8951	0.7278	0.5057	0.3508	0.4022	0.6783	0.9299	0.9855	0.9949	(94)
Useful gains	555.4894	617.2266	660.0156	686.4612	604.4939	420.4275	277.6757	291.4447	444.1089	541.1591	537.8303	535.9584	(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	1129.9091	1095.3563	993.0206	830.4288	636.7995	423.2526	277.9034	291.9709	459.7390	701.5071	932.0074	1125.2717	(97)
Space heating kWh	427.3683	321.3032	247.7557	103.6566	24.0353	0.0000	0.0000	0.0000	0.0000	119.2989	283.8075	438.4491	(98a)
Space heating requirement - total per year (kWh/year)												1965.6746	
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	427.3683	321.3032	247.7557	103.6566	24.0353	0.0000	0.0000	0.0000	0.0000	119.2989	283.8075	438.4491	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1965.6746	
Space heating per m2										(98c) / (4) =		28.0811	(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	427.3683	321.3032	247.7557	103.6566	24.0353	0.0000	0.0000	0.0000	0.0000	119.2989	283.8075	438.4491	(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)	463.0209	348.1074	268.4244	112.3041	26.0405	0.0000	0.0000	0.0000	0.0000	129.2513	307.4837	475.0261	(211)	
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)	
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)	
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)	
Water heating														
Water heating requirement	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878	(64)	
Efficiency of water heater	85.5388	85.1943	84.4830	82.8557	80.7833	79.8000	79.8000	79.8000	79.8000	83.1184	84.9077	79.8000	(216)	
Fuel for water heating, kWh/month	255.1459	226.5422	242.9408	218.6998	217.9954	199.4903	197.4880	205.0668	206.9946	220.8360	228.9014	252.2830	(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	20.9948	16.8428	15.1651	11.1106	8.5821	7.0117	7.8289	10.1763	13.2180	17.3428	19.5886	21.5783	(232)	
Electricity generated by PVs (Appendix M) (negative quantity)	-32.8701	-46.4063	-66.8089	-75.2540	-81.2811	-75.9327	-75.0050	-70.7452	-63.2427	-53.1331	-36.1640	-28.4114	(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)	-18.3768	-38.6803	-76.9148	-115.5671	-152.8459	-153.5740	-151.7560	-128.4671	-94.1378	-55.3206	-24.5385	-14.5294	(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												2129.6583	(211)	
Space heating fuel - main system 2												0.0000	(213)	
Space heating fuel - secondary												0.0000	(215)	
Efficiency of water heater												79.8000		
Water heating fuel used												2672.3842	(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)												169.4401	(232)	
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation												-1729.9627	(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

3327.5199 (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	2129.6583	0.2100	447.2282 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2672.3842	0.2100	561.2007 (264)
Space and water heating			1008.4289 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	169.4401	0.1443	24.4554 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	0.1345	-94.8895
PV Unit electricity exported	-1024.7084	0.1259	-128.9966
Total			-223.8861 (269)
Total CO2, kg/year			820.9275 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.7300 (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	2129.6583	1.1300	2406.5139 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2672.3842	1.1300	3019.7941 (278)
Space and water heating			5426.3080 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	169.4401	1.5338	259.8929 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	1.4973	-1055.9481
PV Unit electricity exported	-1024.7084	0.4621	-473.5061
Total			-1529.4542 (283)
Total Primary energy kWh/year			4286.8475 (286)
Target Primary Energy Rate (TPER)			61.2400 (287)

Energy Report

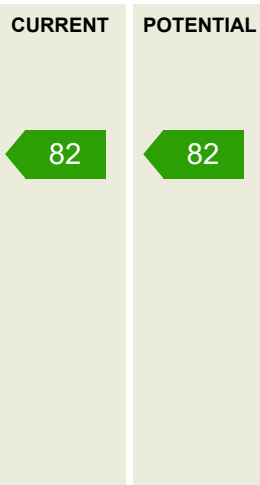
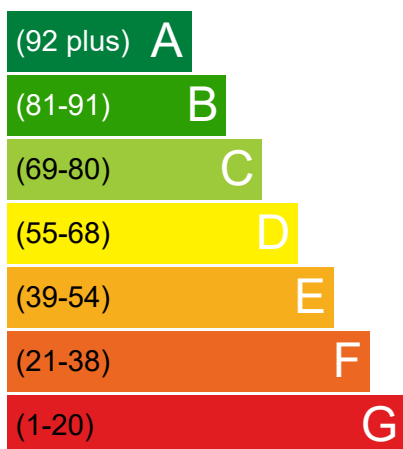
Dwelling Address	
Reference	Block A Flat 1-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

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

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

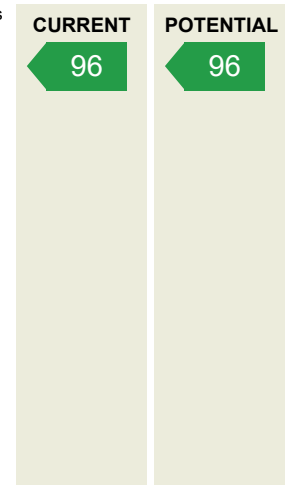
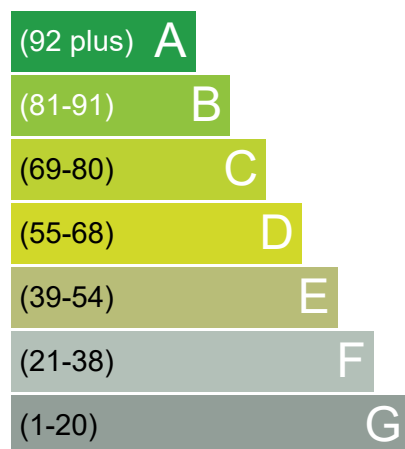
Energy Efficiency Rating

Most energy efficient - lower running costs

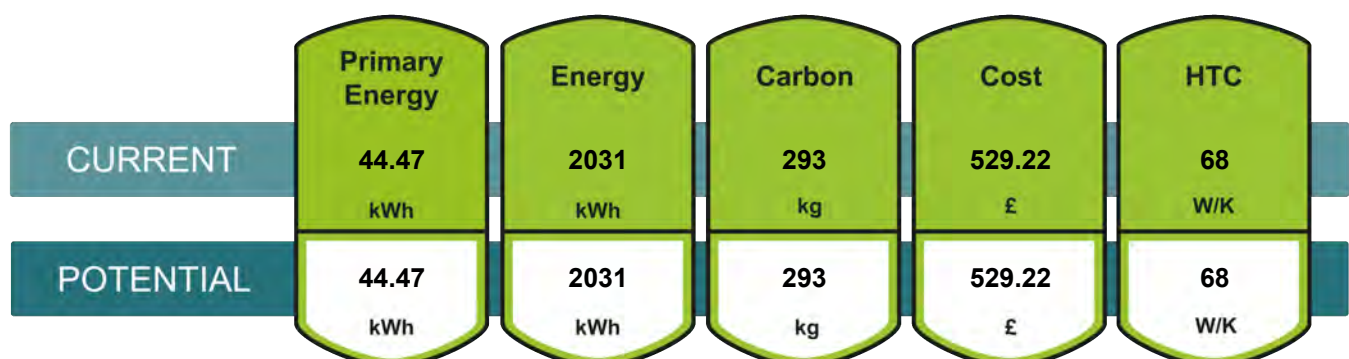


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£50	£50	
Heating		£113	£113	
Hot Water		£366	£366	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£529	£529	

Estimated energy use and potential savings



Space Heating

435

kWh per year



Water Heating

839

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

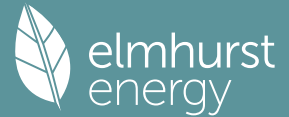
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block A Flat 2				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	82 B	DER	5.33	TER	14.32	
Environmental	96 A	% DER < TER				62.78
CO ₂ Emissions (t/year)	0.25	DFEE	38.01	TFEE	40.37	
Compliance Check	See BREL	% DFEE < TFEE				5.84
% DPER < TPER	24.87	DPER	56.58	TPER	75.31	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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	50.0000 (1b)	2.6000 (2b)	130.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		130.0000 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	130.0000 (5)

2. Ventilation rate

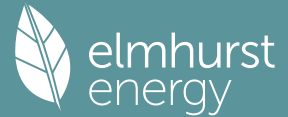
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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												
Opening Type 1			13.1000	1.3258	17.3674			(27)				
Heatloss Floor 1			50.0000	0.1300	6.5000	110.0000	5500.0000	(28a)				
External Wall 1	62.4000	13.1000	49.3000	0.1800	8.8740	190.0000	9366.9996	(29a)				
Total net area of external elements Aum(A, m2)			112.4000					(31)				
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.7414			(33)				
Main dwelling												
Party Ceiling 1			50.0000			20.0000	1000.0000	(32b)				
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		15866.9996	(34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							317.3400	(35)				
List of Thermal Bridges												
K1 Element				Length	Psi-value	Total						
E5 Ground floor (normal)				24.0000	0.0000	0.0000						
E16 Corner (normal)				10.4000	0.0000	0.0000						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000	(36)				
Point Thermal bridges						(36a) =	0.0000					
Total fabric heat loss						(33) + (36) + (36a) =	32.7414	(37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	22.4577	22.4186	22.3802	22.2001	22.1664	22.0095	22.0095	21.9804	22.0699	22.1664	22.2346	22.3059 (38)
Heat transfer coeff	55.1992	55.1600	55.1217	54.9415	54.9078	54.7509	54.7509	54.7218	54.8113	54.9078	54.9760	55.0473 (39)
Average = Sum(39)m / 12 =												54.9413
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1040	1.1032	1.1024	1.0988	1.0982	1.0950	1.0950	1.0944	1.0962	1.0982	1.0995	1.1009 (40)
HLP (average)												1.0988
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.6901 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	22.2178	21.8825	21.4053	20.6908	20.0468	19.1604	18.4878	19.3102	19.7418	20.6202	21.5334	22.2002 (42b)
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383 (42c)
Average daily hot water use (litres/day)												49.6360 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	54.1562	52.6594	51.0209	49.1449	47.3396	45.2917	44.6192	46.6030	48.1960	50.2357	52.3103	54.1385 (44)
Energy conte	79.7272	69.6790	72.9078	64.1956	61.0018	52.3784	49.3055	54.8525	55.9049	64.7338	70.6992	79.5064 (45)
Energy content (annual)										Total = Sum(45)m =		774.8921
Distribution loss (46)m = 0.15 x (45)m	11.9591	10.4519	10.9362	9.6293	9.1503	7.8568	7.3958	8.2279	8.3857	9.7101	10.6049	11.9260 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052 (64)
								Total per year (kWh/year) = Sum(64)m =				1415.3941 (64)
12Total per year (kWh/year)												1415 (64)
Electric shower(s)	42.0893	37.5019	40.9507	39.0787	39.8120	37.9768	39.2427	39.8120	39.0787	40.9507	40.1807	42.0893 (64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				478.7637 (64a)
Heat gains from water heating, kWh/month	80.5507	71.8513	77.9985	73.2299	73.7552	69.0252	69.7238	71.7105	70.4733	75.2807	75.6678	80.4773 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	74.2626	82.2193	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	76.7380	74.2626	76.7380	74.2626 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505 (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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040 (71)
Water heating gains (Table 5)	108.2670	106.9215	104.8367	101.7082	99.1333	95.8683	93.7148	96.3851	97.8795	101.1837	105.0942	108.1684 (72)
Total internal gains	378.1151	386.2542	372.3626	363.5131	348.1163	337.6026	326.4773	327.6198	335.4397	344.4648	361.1972	371.5201 (73)

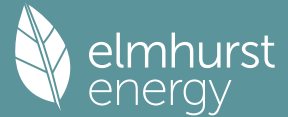
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	432.3869	489.8092	543.5617	625.1013	686.2656	693.1660	661.0138	602.0021	537.4614	466.8720	428.2255	416.6562	(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	79.8472	79.9039	79.9595	80.2217	80.2709	80.5010	80.5010	80.5437	80.4122	80.2709	80.1714	80.0675
alpha	6.3231	6.3269	6.3306	6.3481	6.3514	6.3667	6.3667	6.3696	6.3608	6.3514	6.3448	6.3378
util living area	0.9956	0.9895	0.9704	0.8890	0.7112	0.5022	0.3641	0.4172	0.6796	0.9343	0.9887	0.9965 (86)

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Living	20.1254	20.2819	20.5161	20.8057	20.9598	20.9960	20.9996	20.9990	20.9769	20.7598	20.3930	20.0926
Non living	19.0000	19.1984	19.4898	19.8265	19.9750	20.0032	20.0048	20.0051	19.9919	19.7863	19.3428	18.9601
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	20.5526	20.2819	20.5161	20.8057	20.9598	20.9960	20.9996	20.9990	20.9769	20.7598	20.3930	20.2195 (87)
Th 2	19.9976	19.9982	19.9988	20.0018	20.0023	20.0049	20.0049	20.0054	20.0039	20.0023	20.0012	20.0001 (88)
util rest of house												
	0.9938	0.9854	0.9590	0.8531	0.6468	0.4258	0.2820	0.3275	0.5924	0.9033	0.9835	0.9951 (89)
MIT 2	19.5999	19.1984	19.4898	19.8265	19.9750	20.0032	20.0048	20.0051	19.9919	19.7863	19.3428	19.1475 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	20.0762	19.7401	20.0030	20.3161	20.4674	20.4996	20.5022	20.5021	20.4844	20.2730	19.8679	19.6835 (91)
Temperature adjustment												0.0000
adjusted MIT	20.0762	19.7401	20.0030	20.3161	20.4674	20.4996	20.5022	20.5021	20.4844	20.2730	19.8679	19.6835 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9939	0.9840	0.9590	0.8654	0.6777	0.4641	0.3230	0.3724	0.6356	0.9129	0.9826	0.9945 (94)
Useful gains	429.7699	481.9940	521.2940	540.9417	465.0772	321.6672	213.5390	224.2092	341.6178	426.2132	420.7675	414.3619 (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	870.8354	818.5815	744.3068	627.2181	481.3977	323.0068	213.6480	224.4722	349.9389	531.1247	701.9281	852.3238 (97)
Space heating kWh	328.1528	226.1868	165.9215	62.1190	12.1425	0.0000	0.0000	0.0000	0.0000	78.0541	202.4356	325.8436 (98a)
Space heating requirement - total per year (kWh/year)												1400.8560
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	328.1528	226.1868	165.9215	62.1190	12.1425	0.0000	0.0000	0.0000	0.0000	78.0541	202.4356	325.8436 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1400.8560
Space heating per m2										(98c) / (4) =		28.0171 (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 %)	302.0502 (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	328.1528	226.1868	165.9215	62.1190	12.1425	0.0000	0.0000	0.0000	0.0000	78.0541	202.4356	325.8436 (98)
Space heating efficiency (main heating system 1)	302.0502	302.0502	302.0502	302.0502	302.0502	0.0000	0.0000	0.0000	0.0000	302.0502	302.0502	302.0502 (210)
Space heating fuel (main heating system)	108.6418	74.8838	54.9318	20.5658	4.0200	0.0000	0.0000	0.0000	0.0000	25.8414	67.0205	107.8773 (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	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052 (64)
Efficiency of water heater (217)m	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465 (216)
Fuel for water heating, kWh/month	73.0349	64.6968	69.3215	63.6220	62.8385	57.1872	56.4695	59.4900	59.1075	64.8706	67.1634	72.9147 (219)

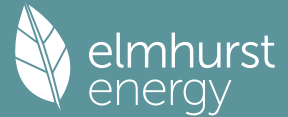
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)
Lighting	16.1887	12.9871	11.6935	8.5671	6.6175	5.4066	6.0367	7.8468	10.1922	13.3727	15.1044	16.6386 (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												463.7825 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												183.6465
Water heating fuel used												770.7167 (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)												130.6518 (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												1843.9147 (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	463.7825	0.1569	72.7847 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	770.7167	0.1403	108.1088 (264)
Energy for instantaneous electric shower(s)	478.7637	0.1391	66.6066 (264a)
Space and water heating			180.8934 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	130.6518	0.1443	18.8571 (268)
Total CO2, kg/year			266.3571 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.3300 (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	463.7825	1.5810	733.2293 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	770.7167	1.5186	1170.4387 (278)
Energy for instantaneous electric shower(s)	478.7637	1.5143	725.0083 (278a)
Space and water heating			1903.6680 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	130.6518	1.5338	200.3981 (282)
Total Primary energy kWh/year			2829.0744 (286)
Dwelling Primary energy Rate (DPER)			56.5800 (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	50.0000 (1b)	x 2.6000 (2b)	= 130.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	130.0000 (5)

2. Ventilation rate

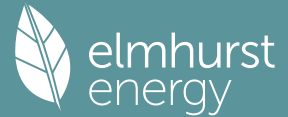
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1538 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4038 (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) = 0.3433 (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	0.4377	0.4291	0.4205	0.3776	0.3690	0.3261	0.3261	0.3175	0.3433	0.3690	0.3862	0.4033 (22b)
Effective ac	0.5958	0.5921	0.5884	0.5713	0.5681	0.5532	0.5532	0.5504	0.5589	0.5681	0.5746	0.5813 (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 Opening Type			12.5000	1.1450	14.3130		(27)
Heatloss Floor 1			50.0000	0.1300	6.5000		(28a)
External Wall 1	62.4000	12.5000	49.9000	0.1800	8.9820		(29a)
Total net area of external elements Aum(A, m2)			112.4000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		29.7950		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							327.3400 (35)
List of Thermal Bridges							
K1 Element							
E5 Ground floor (normal)				Length 24.0000	Psi-value 0.1600	Total 3.8400	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000 0.0900 0.9360

4.7760 (36)
0.0000
(33) + (36) + (36a) = 34.5710 (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	25.5588	25.3993	25.2429	24.5083	24.3709	23.7311	23.7311	23.6126	23.9775	24.3709	24.6489	24.9396 (38)
Heat transfer coeff	60.1298	59.9702	59.8139	59.0793	58.9419	58.3021	58.3021	58.1836	58.5485	58.9419	59.2199	59.5106 (39)
Average = Sum(39)m / 12 =												59.0786

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2026	1.1994	1.1963	1.1816	1.1788	1.1660	1.1660	1.1637	1.1710	1.1788	1.1844	1.1902 (40)
HLP (average)												1.1816
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy
Hot water usage for mixer showers
Hot water usage for baths
Hot water usage for other uses
Average daily hot water use (litres/day)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot water usage for mixer showers	52.5569	51.7671	50.6162	48.4141	46.7890	44.9767	43.9465	45.0888	46.3409	48.2867	50.5361	52.3556 (42a)
Hot water usage for baths	22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476 (42b)
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383 (42c)
Average daily hot water use (litres/day)												98.5597 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	107.2197	104.9310	102.1434	97.9036	94.4609	90.7597	89.3366	92.1121	95.0395	98.9252	103.2304	106.9415 (44)
Energy conte	169.8097	149.4203	156.9906	134.0251	127.1626	111.5996	108.0448	114.0541	117.1932	134.2406	147.0706	167.4445 (45)
Energy content (annual)												1637.0557
Distribution loss (46)m = 0.15 x (45)m	25.4715	22.4130	23.5486	20.1038	19.0744	16.7399	16.2067	17.1081	17.5790	20.1361	22.0606	25.1167 (46)
Water storage loss:												150.0000 (47)
Store volume												1.3938 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.7527 (55)
Enter (49) or (54) in (55)												
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (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	216.4047	191.5060	203.5855	179.1170	173.7575	156.6915	154.6398	160.6490	162.2850	180.8355	192.1624	214.0394 (62)
WWHRS	-24.0268	-21.2495	-22.2513	-18.4249	-17.1714	-14.6937	-13.7730	-14.6462	-15.2026	-17.9222	-20.3037	-23.5819 (63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
12Total per year (kWh/year)												1962.4258 (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	93.7377	83.3508	89.4753	80.6368	79.5575	73.1803	73.2008	75.1989	75.0402	81.9109	84.9744	92.9512 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	74.2626	82.2193	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	76.7380	74.2626	76.7380	74.2626 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505 (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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040 (71)
Water heating gains (Table 5)	125.9915	124.0340	120.2625	111.9956	106.9321	101.6394	98.3882	101.0738	104.2225	110.0953	118.0201	124.9344 (72)
Total internal gains	398.8396	406.3666	390.7883	376.8005	358.9151	343.3736	331.1507	332.3085	341.7827	356.3764	377.1230	391.2862 (73)

6. Solar gains

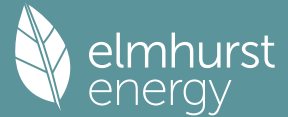
[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	5.9200	11.2829	0.6300	0.7000	0.7700	20.4134 (75)						
Southeast	2.0000	36.7938	0.6300	0.7000	0.7700	22.4893 (77)						
Northwest	4.5800	11.2829	0.6300	0.7000	0.7700	15.7928 (81)						
Solar gains	58.6956	112.0065	185.1961	283.0098	365.8660	384.7171	361.9623	296.8614	218.5503	132.4040	72.4939	48.8140 (83)
Total gains	457.5351	518.3731	575.9844	659.8103	724.7811	728.0907	693.1130	629.1699	560.3330	488.7804	449.6169	440.1002 (84)

7. Mean internal temperature (heating season)

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

21.0000 (85)

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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	75.6096	75.8107	76.0090	76.9540	77.1334	77.9799	77.9799	78.1387	77.6517	77.1334	76.7713	76.3963
alpha	6.0406	6.0540	6.0673	6.1303	6.1422	6.1987	6.1987	6.2092	6.1768	6.1422	6.1181	6.0931
util living area	0.9953	0.9891	0.9703	0.8917	0.7179	0.5085	0.3696	0.4242	0.6915	0.9371	0.9886	0.9962 (86)
MIT	20.0618	20.2256	20.4723	20.7831	20.9523	20.9950	20.9994	20.9987	20.9716	20.7342	20.3510	20.0387 (87)
Th 2	19.9179	19.9205	19.9230	19.7838	19.9370	19.9473	19.9473	19.9492	19.9433	19.9370	19.9325	19.9278 (88)
util rest of house	0.9933	0.9847	0.9583	0.8545	0.6498	0.4269	0.2815	0.3280	0.5989	0.9055	0.9831	0.9946 (89)
MIT 2	18.8548	19.0639	19.3721	19.7409	19.9050	19.9452	19.9471	19.9489	19.9289	19.6998	19.2333	18.8330 (90)
Living area fraction									FLA = Living area / (4) =			0.5000 (91)
MIT	19.4583	19.6447	19.9222	20.2620	20.4287	20.4701	20.4733	20.4738	20.4503	20.2170	19.7921	19.4358 (92)
Temperature adjustment												0.0000
adjusted MIT	19.4583	19.6447	19.9222	20.2620	20.4287	20.4701	20.4733	20.4738	20.4503	20.2170	19.7921	19.4358 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9922	0.9833	0.9583	0.8670	0.6824	0.4677	0.3256	0.3762	0.6448	0.9151	0.9822	0.9937 (94)
Useful gains	453.9623	509.7147	551.9846	572.0811	494.5720	340.5481	225.6744	236.6825	361.3178	447.2877	441.6204	437.3144 (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	911.4675	884.2458	802.8340	671.2603	514.4837	342.2393	225.8202	237.0271	371.7996	566.8438	751.6271	906.6912 (97)
Space heating kWh	340.3839	251.6849	186.6319	71.4090	14.8142	0.0000	0.0000	0.0000	0.0000	88.9498	223.2048	349.2163 (98a)
Space heating requirement - total per year (kWh/year)												1526.2949
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	340.3839	251.6849	186.6319	71.4090	14.8142	0.0000	0.0000	0.0000	0.0000	88.9498	223.2048	349.2163 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1526.2949
Space heating per m2										(98c) / (4) =		30.5259 (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	340.3839	251.6849	186.6319	71.4090	14.8142	0.0000	0.0000	0.0000	0.0000	88.9498	223.2048	349.2163 (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)	368.7799	272.6814	202.2014	77.3662	16.0501	0.0000	0.0000	0.0000	0.0000	96.3703	241.8254	378.3492 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
Efficiency of water heater (217)m	85.3251	84.9348	84.1244	82.3684	80.5052	79.8000	79.8000	79.8000	79.8000	82.7624	84.6471	79.8000 (216)
Fuel for water heating, kWh/month	225.4644	200.4556	215.5547	195.0894	194.5043	177.9421	176.5248	182.9609	184.3137	196.8446	203.0297	223.0159 (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	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	15.4303	12.3788	11.1457	8.1658	6.3075	5.1533	5.7539	7.4792	9.7147	12.7462	14.3968	15.8592 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-23.8319	-33.8314	-48.9876	-55.5376	-60.3279	-56.5260	-55.8772	-52.5565	-46.7283	-38.9382	-26.3015	-20.5810 (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	-12.7730	-26.9447	-53.6721	-80.7632	-106.9058	-107.4073	-106.0950	-89.7380	-65.6863	-38.5287	-17.0574	-10.0911 (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												1653.6240 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2375.7001 (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)												124.5314 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1235.6876 (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

3004.1678 (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	1653.6240	0.2100	347.2610 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2375.7001	0.2100	498.8970 (264)
Space and water heating			846.1581 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	124.5314	0.1443	17.9737 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.0251	0.1344	-69.8924
PV Unit electricity exported	-715.6625	0.1259	-90.0679
Total			-159.9603 (269)
Total CO2, kg/year			716.1008 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.3200 (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	1653.6240	1.1300	1868.5951 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2375.7001	1.1300	2684.5411 (278)
Space and water heating			4553.1362 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	124.5314	1.5338	191.0104 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.0251	1.4967	-778.3300
PV Unit electricity exported	-715.6625	0.4620	-330.6104
Total			-1108.9404 (283)
Total Primary energy kWh/year			3765.3070 (286)
Target Primary Energy Rate (TPER)			75.3100 (287)

Energy Report

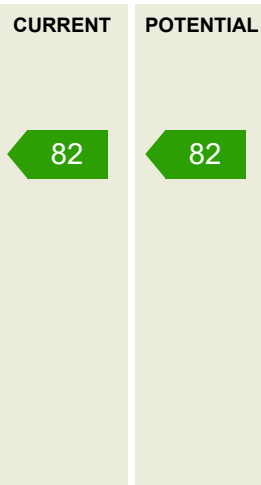
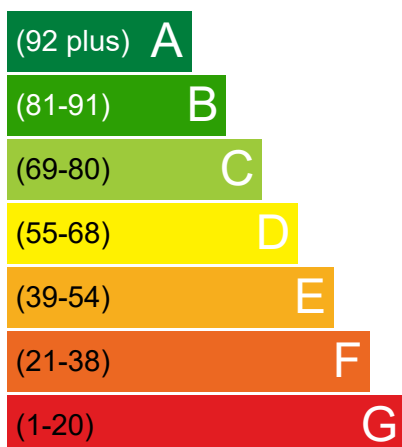
Dwelling Address	
Reference	Block A Flat 2-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	50

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

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

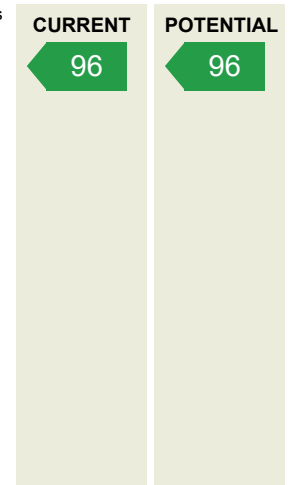
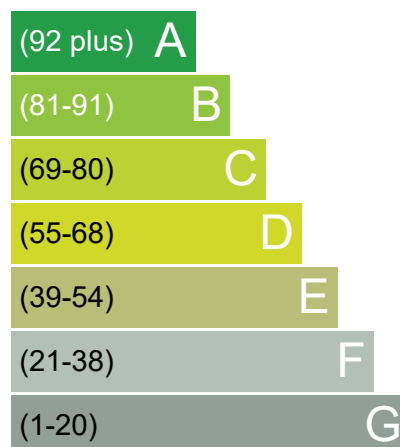
Energy Efficiency Rating

Most energy efficient - lower running costs

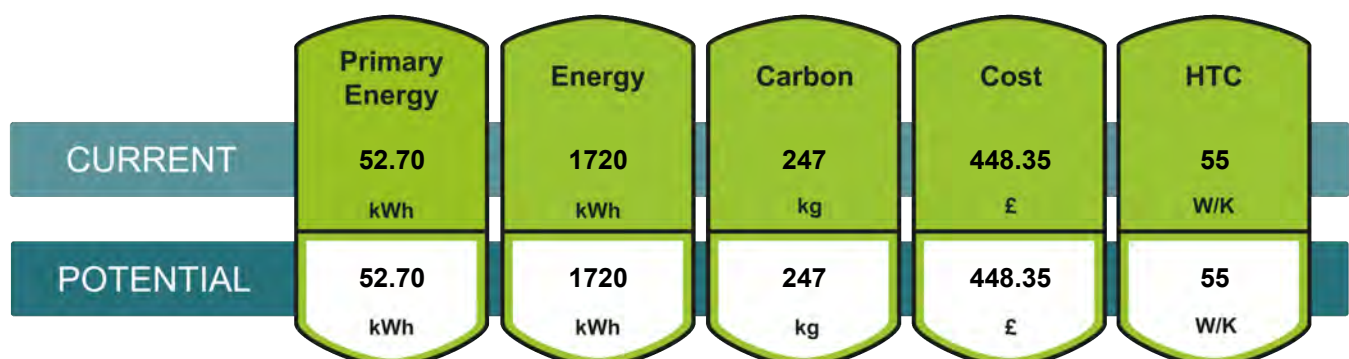


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£34	£34	
Heating		£89	£89	
Hot Water		£326	£326	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£448	£448	

Estimated energy use and potential savings



Space Heating

340

kWh per year



Water Heating

771

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

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Property Reference	Block A Flat 3				Issued on Date	15/04/2025	
Assessment Reference	Be Green			Prop Type Ref			
Property							
SAP Rating	82 B		DER	4.54		TER	11.47
Environmental	96 A		% DER < TER				60.42
CO ₂ Emissions (t/year)	0.3		DFEE	33.17		TFEE	34.37
Compliance Check	See BREL		% DFEE < TFEE				3.50
% DPER < TPER	19.51		DPER	48.20		TPER	59.88
Assessor Details	Mr. Joe Mountain					Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		
Dwelling volume			

2. Ventilation rate

Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	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)

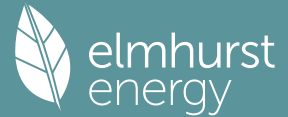
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1700 (21)

	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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	72.8000	13.1000	59.7000	0.1800	10.7460	190.0000	11342.9995 (29a)
External Roof 1	70.0000		70.0000	0.1300	9.1000	9.0000	630.0000 (30)
Total net area of external elements Aum(A, m ²)			142.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	37.2134		(33)
Main dwelling							
Party Floor 1			70.0000			30.0000	2100.0000 (32d)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	14072.9995 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							201.0428 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E7 Party floor between dwellings (in blocks of flats)				28.0000	0.0000	0.0000	
E14 Flat roof				28.0000	0.0000	0.0000	
E16 Corner (normal)				10.4000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	37.2134 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 31.4408	Feb 31.3860	Mar 31.3323	Apr 31.0801	May 31.0329	Jun 30.8132	Jul 30.8132	Aug 30.7726	Sep 30.8979	Oct 31.0329	Nov 31.1284	Dec 31.2282	(38)
Heat transfer coeff	68.6542	68.5995	68.5458	68.2935	68.2464	68.0267	68.0267	67.9860	68.1113	68.2464	68.3418	68.4416	(39)
Average = Sum(39)m / 12 =												68.2933	
HLP	Jan 0.9808	Feb 0.9800	Mar 0.9792	Apr 0.9756	May 0.9749	Jun 0.9718	Jul 0.9718	Aug 0.9712	Sep 0.9730	Oct 0.9749	Nov 0.9763	Dec 0.9777	(40)
HLP (average)												0.9756	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461	(42)
Hot water usage for mixer showers														
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths														
26.1376	25.7430	25.1817	24.3411	23.5836	22.5407	21.7495	22.7170	23.2247	24.2581	25.3324	26.1169			(42b)
Hot water usage for other uses														
37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326			(42c)
Average daily hot water use (litres/day)													58.4472	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	63.7702	62.0071	60.0774	57.8683	55.7423	53.3310	52.5398	54.8757	56.7519	59.1537	61.5965	63.7494		(44)
Energy content (annual)	93.8807	82.0480	85.8493	75.5905	71.8296	61.6755	58.0580	64.5897	65.8294	76.2256	83.2498	93.6207		(45)
Distribution loss (46)m = 0.15 x (45)m	14.0821	12.3072	12.8774	11.3386	10.7744	9.2513	8.7087	9.6885	9.8744	11.4338	12.4875	14.0431		(46)
Water storage loss:														
Store volume													150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8600	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													1.0044	(55)
Total storage loss														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364			(56)
If cylinder contains dedicated solar storage														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364			(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														
148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195			(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63d)
Output from w/h	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195		(64)
12Total per year (kWh/year)													1552.9488	(64)
Electric shower(s)	49.5554	44.1543	48.2148	46.0108	46.8741	44.7134	46.2038	46.8741	46.0108	48.2148	47.3081	49.5554		(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													563.6896	(64a)
Heat gains from water heating, kWh/month														
87.1232	77.6270	84.1176	78.7517	79.1209	73.8006	74.3743	76.7137	75.5062	80.9177	81.6228	87.0368			(65)

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

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(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)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Water heating gains (Table 5)	117.1011	115.5164	113.0613	109.3774	106.3453	102.5009	99.9654	103.1098	104.8697	108.7604	113.3650	116.9849	(72)
Total internal gains	472.1333	483.4221	464.9817	453.6826	433.4179	419.9110	405.3021	406.3991	416.6863	428.1923	450.0294	463.3119	(73)

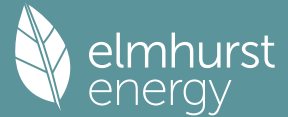
6. Solar gains

[Jan]												Gains	
				Area	Solar flux		g		FF		Access		Gains
				m2	Table 6a		Specific data		Specific data		factor		W
					W/m2		or Table 6b		or Table 6c		Table 6d		
Northeast				6.2000		11.2829		0.3500		0.0000		0.7700	18.8527 (75)
Southeast				2.1000		36.7938		0.3500		0.0000		0.7700	20.8235 (77)
Northwest				4.8000		11.2829		0.3500		0.0000		0.7700	14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	526.4051	586.9771	636.1808	715.2708	771.5672	775.4744	739.8386	680.7815	618.7081	550.5994	517.0577	508.4480	(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	56.9399	56.9854	57.0300	57.2406	57.2802	57.4652	57.4996	57.3938	57.2802	57.2002	57.1168			
alpha	4.7960	4.7990	4.8020	4.8160	4.8187	4.8310	4.8333	4.8263	4.8187	4.8133	4.8078			
util living area	0.9869	0.9769	0.9543	0.8819	0.7387	0.5457	0.4015	0.4535	0.6989	0.9145	0.9749	0.9889	(86)	

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Living	19.8209	20.0012	20.2724	20.6319	20.8782	20.9771	20.9957	20.9925	20.9293	20.6117	20.1607	19.7825
Non living	18.7315	18.9594	19.2986	19.7322	20.0006	20.0928	20.1052	20.1042	20.0559	19.7189	19.1653	18.6846
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	20.3968	20.0012	20.2724	20.6319	20.8782	20.9771	20.9957	20.9925	20.9293	20.6117	20.1607	19.9528 (87)
Th 2	20.0994	20.1000	20.1007	20.1037	20.1043	20.1069	20.1069	20.1074	20.1059	20.1043	20.1031	20.1019 (88)
util rest of house	0.9837	0.9712	0.9431	0.8547	0.6878	0.4755	0.3215	0.3683	0.6278	0.8883	0.9678	0.9861 (89)
MIT 2	19.5541	18.9594	19.2986	19.7322	20.0006	20.0928	20.1052	20.1042	20.0559	19.7189	19.1653	18.9400 (90)
Living area fraction									FLA = Living area / (4) =			0.3857 (91)
MIT	19.8791	19.3612	19.6742	20.0792	20.3391	20.4339	20.4487	20.4468	20.3928	20.0632	19.5492	19.3306 (92)
Temperature adjustment												0.0000
adjusted MIT	19.8791	19.3612	19.6742	20.0792	20.3391	20.4339	20.4487	20.4468	20.3928	20.0632	19.5492	19.3306 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9828	0.9654	0.9367	0.8539	0.7018	0.5017	0.3524	0.4011	0.6517	0.8870	0.9622	0.9831 (94)
Useful gains	517.3354	566.6953	595.9422	610.7693	541.4923	389.0847	260.6938	273.0625	403.2254	488.3606	497.5258	499.8433 (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	1069.5740	992.0335	903.0372	763.4689	589.5868	396.8578	261.8154	275.1285	428.6100	645.8319	850.8038	1035.5662 (97)
Space heating kWh	410.8655	285.8273	228.4787	109.9438	35.7824	0.0000	0.0000	0.0000	0.0000	117.1586	254.3602	398.5778 (98a)
Space heating requirement - total per year (kWh/year)												1840.9942
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	410.8655	285.8273	228.4787	109.9438	35.7824	0.0000	0.0000	0.0000	0.0000	117.1586	254.3602	398.5778 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1840.9942
Space heating per m2										(98c) / (4) =		26.2999 (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 %)												306.0519 (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	410.8655	285.8273	228.4787	109.9438	35.7824	0.0000	0.0000	0.0000	0.0000	117.1586	254.3602	398.5778 (98)
Space heating efficiency (main heating system 1)	306.0519	306.0519	306.0519	306.0519	306.0519	0.0000	0.0000	0.0000	0.0000	306.0519	306.0519	306.0519 (210)
Space heating fuel (main heating system)	134.2470	93.3918	74.6536	35.9232	11.6916	0.0000	0.0000	0.0000	0.0000	38.2806	83.1102	130.2321 (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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195 (64)
Efficiency of water heater (217)m	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275 (216)
Fuel for water heating, kWh/month	80.1392	70.8989	75.7985	69.3056	68.2214	61.7851	60.7784	64.3086	64.0302	70.5973	73.4452	79.9987 (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	23.9244	19.1931	17.2812	12.6610	9.7797	7.9901	8.9214	11.5963	15.0625	19.7628	22.3220	24.5894 (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												601.5302 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												185.0275
Water heating fuel used												839.3070 (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)												193.0839 (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												2197.6107 (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	601.5302	0.1561	93.9109 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	839.3070	0.1404	117.8257 (264)
Energy for instantaneous electric shower(s)	563.6896	0.1391	78.4217 (264a)
Space and water heating			211.7366 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	193.0839	0.1443	27.8680 (268)
Total CO2, kg/year			318.0263 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5400 (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	601.5302	1.5780	949.1937 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	839.3070	1.5191	1274.9612 (278)
Energy for instantaneous electric shower(s)	563.6896	1.5143	853.6145 (278a)
Space and water heating			2224.1548 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	193.0839	1.5338	296.1585 (282)
Total Primary energy kWh/year			3373.9278 (286)
Dwelling Primary energy Rate (DPER)			48.2000 (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	70.0000 (1b)	x 2.6000 (2b)	= 182.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	182.0000 (5)

2. Ventilation rate

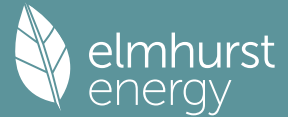
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1099 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3599 (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) = 0.3059 (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	0.3900	0.3824	0.3747	0.3365	0.3288	0.2906	0.2906	0.2830	0.3059	0.3288	0.3441	0.3594 (22b)
Effective ac	0.5761	0.5731	0.5702	0.5566	0.5541	0.5422	0.5422	0.5400	0.5468	0.5541	0.5592	0.5646 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	72.8000	13.1000	59.7000	0.1800	10.7460		(29a)
External Roof 1	70.0000		70.0000	0.1100	7.7000		(30)
Total net area of external elements Aum(A, m2)			142.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		33.4460		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							201.0428 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

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E7 Party floor between dwellings (in blocks of flats)	28.0000	0.0700	1.9600										
E14 Flat roof	28.0000	0.0800	2.2400										
E16 Corner (normal)	10.4000	0.0900	0.9360										
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				5.1360 (36)									
Point Thermal bridges			(36a) =	0.0000									
Total fabric heat loss		(33) + (36) + (36a) =		38.5820 (37)									
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	34.5983	34.4209	34.2470	33.4303	33.2775	32.5662	32.5662	32.4345	32.8402	33.2775	33.5866	33.9098	(38)
Average = Sum(39)m / 12 =	73.1803	73.0029	72.8290	72.0123	71.8595	71.1482	71.1482	71.0165	71.4222	71.8595	72.1686	72.4918	(39)
												72.0116	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0454	1.0429	1.0404	1.0287	1.0266	1.0164	1.0164	1.0145	1.0203	1.0266	1.0310	1.0356	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	
												1.0287	
												31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461 (42)
Hot water usage for mixer showers													
Hot water usage for baths	61.8798	60.9498	59.5947	57.0020	55.0887	52.9549	51.7420	53.0869	54.5611	56.8521	59.5005	61.6427	(42a)
Hot water usage for other uses	26.7336	26.3365	25.7774	24.7465	23.9746	23.1187	22.6564	23.2116	23.8161	24.7319	25.7840	26.6432	(42b)
Average daily hot water use (litres/day)	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326	(42c)
												116.0487	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	126.2459	123.5505	120.2678	115.2758	111.2220	106.8639	105.1887	108.4572	111.9043	116.4797	121.5487	125.9184	(44)
Energy content (annual)	199.9426	175.9342	184.8472	157.8067	149.7262	131.4016	127.2166	134.2926	137.9892	158.0618	173.1684	197.1578	(45)
Distribution loss (46)m = 0.15 x (45)m													
Water storage loss:	29.9914	26.3901	27.7271	23.6710	22.4589	19.7102	19.0825	20.1439	20.6984	23.7093	25.9753	29.5737	(46)
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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	246.5375	218.0199	231.4421	202.8986	196.3211	176.4934	173.8115	180.8875	183.0811	204.6567	218.2602	243.7527	(62)
WWHRS	-28.2888	-25.0189	-26.1983	-21.6933	-20.2173	-17.3001	-16.2161	-17.2442	-17.8994	-21.1014	-23.9053	-27.7650	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878	(64)
12Total per year (kWh/year)												2213.3143	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month	103.7568	92.1667	98.7376	88.5442	87.0599	79.7645	79.5754	81.9282	81.9549	89.8315	93.6520	102.8309	(65)

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

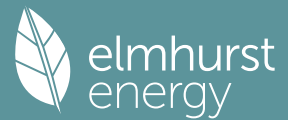
Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	(68)
Pumps, fans	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Water heating gains (Table 5)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Total internal gains	139.4581	137.1528	132.7118	122.9781	117.0160	110.7840	106.9562	110.1186	113.8262	120.7412	130.0722	138.2136	(72)
	497.4904	508.0585	487.6322	470.2832	447.0886	428.1941	412.2929	413.4079	425.6429	443.1731	469.7366	487.5406	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W			
Northeast				6.2000	11.2829	0.6300		0.7000		0.7700		21.3789 (75)			
Southeast				2.1000	36.7938	0.6300		0.7000		0.7700		23.6138 (77)			
Northwest				4.8000	11.2829	0.6300		0.7000		0.7700		16.5514 (81)			
Solar gains				61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843 (83)
Total gains				559.0345	625.4899	681.7720	766.9243	830.5499	831.4030	791.6573	724.5575	654.7355	581.9828	545.7467	538.7249 (84)

7. Mean internal temperature (heating season)

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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	53.4183	53.5481	53.6760	54.2847	54.4001	54.9440	54.9440	55.0459	54.7332	54.4001	54.1671	53.9256
alpha	4.5612	4.5699	4.5784	4.6190	4.6267	4.6629	4.6629	4.6697	4.6489	4.6267	4.6111	4.5950
util living area	0.9845	0.9730	0.9476	0.8702	0.7232	0.5322	0.3923	0.4448	0.6905	0.9079	0.9715	0.9867 (86)
MIT	19.7548	19.9489	20.2393	20.6205	20.8740	20.9760	20.9953	20.9918	20.9241	20.5924	20.1205	19.7251 (87)
Th 2	20.0456	20.0477	20.0498	20.0594	20.0613	20.0697	20.0697	20.0713	20.0664	20.0613	20.0576	20.0538 (88)
util rest of house	0.9806	0.9665	0.9349	0.8407	0.6701	0.4607	0.3109	0.3579	0.6170	0.8797	0.9635	0.9834 (89)
MIT 2	18.6088	18.8546	19.2177	19.6801	19.9554	20.0551	20.0679	20.0679	20.0134	19.6602	19.0809	18.5771 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.0509	19.2767	19.6117	20.0429	20.3097	20.4103	20.4256	20.4242	20.3647	20.0198	19.4819	19.0199 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.0509	19.2767	19.6117	20.0429	20.3097	20.4103	20.4256	20.4242	20.3647	20.0198	19.4819	19.0199 (93)

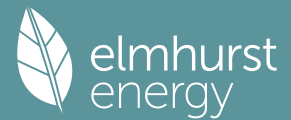
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9754	0.9598	0.9278	0.8401	0.6848	0.4874	0.3423	0.3913	0.6417	0.8783	0.9572	0.9786 (94)
Useful gains	545.2798	600.3453	632.5593	644.2990	568.7627	405.2431	270.9532	283.5289	420.1226	511.1420	522.4132	527.2206 (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	1079.4721	1049.5410	954.9121	802.4224	618.6899	413.3933	272.1859	285.7869	447.4377	676.9003	893.5836	1074.3206 (97)
Space heating kWh	397.4391	301.8595	239.8304	113.8489	37.1459	0.0000	0.0000	0.0000	0.0000	123.3242	267.2427	407.0424 (98a)
Space heating requirement - total per year (kWh/year)												1887.7331
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	397.4391	301.8595	239.8304	113.8489	37.1459	0.0000	0.0000	0.0000	0.0000	123.3242	267.2427	407.0424 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1887.7331
Space heating per m2												(98c) / (4) = 26.9676 (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	397.4391	301.8595	239.8304	113.8489	37.1459	0.0000	0.0000	0.0000	0.0000	123.3242	267.2427	407.0424 (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)	430.5949	327.0417	259.8380	123.3466	40.2447	0.0000	0.0000	0.0000	0.0000	133.6123	289.5371	440.9993 (211)	
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)	
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)	
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)	
Water heating													
Water heating requirement	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878 (64)	
Efficiency of water heater (217)m	85.3863	85.0586	84.4099	83.0478	81.2341	79.8000	79.8000	79.8000	79.8000	83.1882	84.7744	79.8000 (216)	
Fuel for water heating, kWh/month	255.6014	226.9036	243.1511	218.1941	216.7854	199.4903	197.4880	205.0668	206.9946	220.6506	229.2614	252.7393 (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	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	20.9948	16.8428	15.1651	11.1106	8.5821	7.0117	7.8289	10.1763	13.2180	17.3428	19.5886	21.5783 (232)	
Electricity generated by PVs (Appendix M) (negative quantity)	-32.8701	-46.4063	-66.8089	-75.2540	-81.2811	-75.9327	-75.0050	-70.7452	-63.2427	-53.1331	-36.1640	-28.4114 (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)	-18.3768	-38.6803	-76.9148	-115.5671	-152.8459	-153.5740	-151.7560	-128.4671	-94.1378	-55.3206	-24.5385	-14.5294 (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												2045.2146 (211)	
Space heating fuel - main system 2												0.0000 (213)	
Space heating fuel - secondary												0.0000 (215)	
Efficiency of water heater												79.8000	
Water heating fuel used												2672.3269 (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)												169.4401 (232)	
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1729.9627 (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													

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Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3243.0189 (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	2045.2146	0.2100	429.4951 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2672.3269	0.2100	561.1886 (264)
Space and water heating			990.6837 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	169.4401	0.1443	24.4554 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	0.1345	-94.8895
PV Unit electricity exported	-1024.7084	0.1259	-128.9966
Total			-223.8861 (269)
Total CO2, kg/year			803.1823 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.4700 (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	2045.2146	1.1300	2311.0925 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2672.3269	1.1300	3019.7294 (278)
Space and water heating			5330.8219 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	169.4401	1.5338	259.8929 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	1.4973	-1055.9481
PV Unit electricity exported	-1024.7084	0.4621	-473.5061
Total			-1529.4542 (283)
Total Primary energy kWh/year			4191.3613 (286)
Target Primary Energy Rate (TPER)			59.8800 (287)

Energy Report



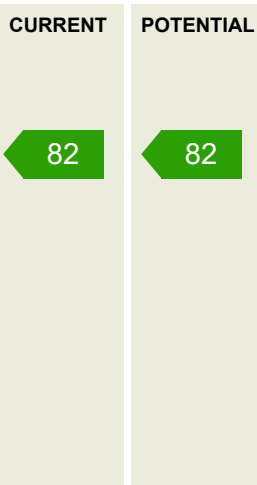
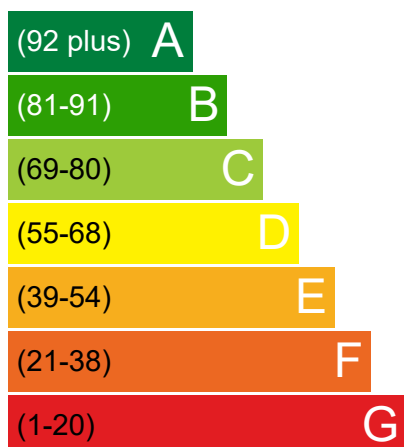
Dwelling Address	
Reference	Block A Flat 3-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

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

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

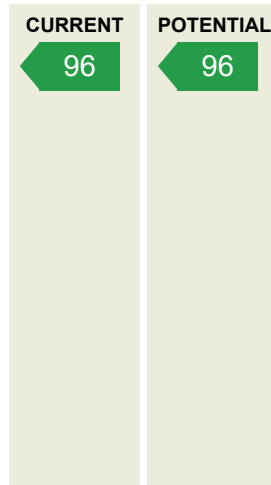
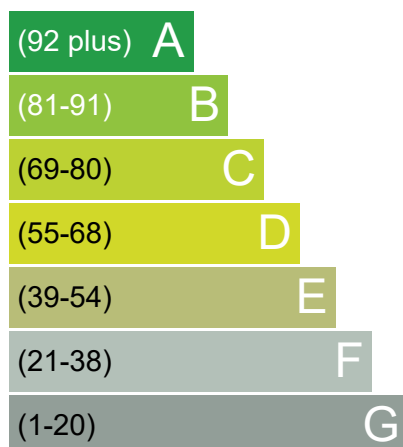
Energy Efficiency Rating

Most energy efficient - lower running costs

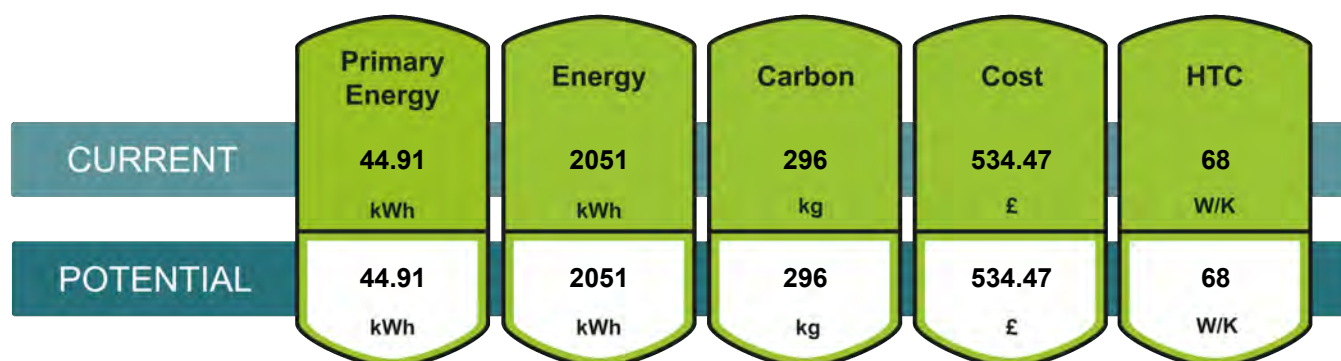


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£50	£50	
Heating		£119	£119	
Hot Water		£366	£366	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£534	£534	

Estimated energy use and potential savings



Space Heating

455

kWh per year



Water Heating

839

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

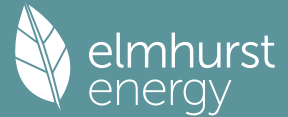
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Full SAP Calculation Printout



Property Reference	Block A Flat 4				Issued on Date	15/04/2025	
Assessment Reference	Be Green			Prop Type Ref			
Property							
SAP Rating	82 B	DER	5.35	TER	14.10		
Environmental	96 A	% DER < TER				62.06	
CO ₂ Emissions (t/year)	0.25	DFEE	37.98	TFEE	38.98		
Compliance Check	See BREL	% DFEE < TFEE				2.56	
% DPER < TPER	23.32	DPER	56.83	TPER	74.11		
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001	
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	50.0000 (1b)	2.6000 (2b)	130.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	130.0000 (5)

2. Ventilation rate

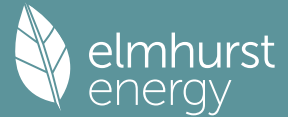
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	62.4000	13.1000	49.3000	0.1800	8.8740	190.0000	9366.9996 (29a)
External Roof 1	50.0000		50.0000	0.1300	6.5000	9.0000	450.0000 (30)
Total net area of external elements Aum(A, m ²)			112.4000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		32.7414		(33)
Main dwelling							
Party Floor 1			50.0000			30.0000	1500.0000 (32d)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	11316.9996 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							226.3400 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E7 Party floor between dwellings (in blocks of flats)				24.0000	0.0000	0.0000	
E14 Flat roof				24.0000	0.0000	0.0000	
E16 Corner (normal)				10.4000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	32.7414 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 22.4577	Feb 22.4186	Mar 22.3802	Apr 22.2001	May 22.1664	Jun 22.0095	Jul 22.0095	Aug 21.9804	Sep 22.0699	Oct 22.1664	Nov 22.2346	Dec 22.3059	(38)
Heat transfer coeff	55.1992	55.1600	55.1217	54.9415	54.9078	54.7509	54.7509	54.7218	54.8113	54.9078	54.9760	55.0473	(39)
Average = Sum(39)m / 12 =												54.9413	
HLP	Jan 1.1040	Feb 1.1032	Mar 1.1024	Apr 1.0988	May 1.0982	Jun 1.0950	Jul 1.0950	Aug 1.0944	Sep 1.0962	Oct 1.0982	Nov 1.0995	Dec 1.1009	(40)
HLP (average)												1.0988	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.6901	(42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	22.2178	21.8825	21.4053	20.6908	20.0468	19.1604	18.4878	19.3102	19.7418	20.6202	21.5334	22.2002	22.2002	(42b)
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383	31.9383	(42c)
Average daily hot water use (litres/day)													49.6360	(43)
Daily hot water use	Jan 54.1562	Feb 52.6594	Mar 51.0209	Apr 49.1449	May 47.3396	Jun 45.2917	Jul 44.6192	Aug 46.6030	Sep 48.1960	Oct 50.2357	Nov 52.3103	Dec 54.1385	54.1385	(44)
Energy conte	79.7272	69.6790	72.9078	64.1956	61.0018	52.3784	49.3055	54.8525	55.9049	64.7338	70.6992	79.5064	79.5064	(45)
Energy content (annual)													774.8921	
Distribution loss (46)m = 0.15 x (45)m	11.9591	10.4519	10.9362	9.6293	9.1503	7.8568	7.3958	8.2279	8.3857	9.7101	10.6049	11.9260	11.9260	(46)
Water storage loss:													150.0000	(47)
Store volume													1.8600	(48)
a) If manufacturer declared loss factor is known (kWh/day):													0.5400	(49)
Temperature factor from Table 2b													1.0044	(55)
Enter (49) or (54) in (55)														
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	(56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	(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	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	0.0000	(61)
Total heat required for water heating calculated for each month	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052	133.9052	(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	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	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	0.0000	(63d)
Output from w/h	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052	133.9052	(64)
12Total per year (kWh/year)													1415.3941	(64)
Electric shower(s)	42.0893	37.5019	40.9507	39.0787	39.8120	37.9768	39.2427	39.8120	39.0787	40.9507	40.1807	42.0893	42.0893	(64a)
Heat gains from water heating, kWh/month	80.5507	71.8513	77.9985	73.2299	73.7552	69.0252	69.7238	71.7105	70.4733	75.2807	75.6678	80.4773	80.4773	(65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													478.7637	(64a)

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

Metabolic gains (Table 5), Watts														
(66)m	Jan 84.5050	Feb 84.5050	Mar 84.5050	Apr 84.5050	May 84.5050	Jun 84.5050	Jul 84.5050	Aug 84.5050	Sep 84.5050	Oct 84.5050	Nov 84.5050	Dec 84.5050	84.5050	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	74.2626	82.2193	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376	140.7376	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	(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	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	(71)
Water heating gains (Table 5)	108.2670	106.9215	104.8367	101.7082	99.1333	95.8683	93.7148	96.3851	97.8795	101.1837	105.0942	108.1684	108.1684	(72)
Total internal gains	378.1151	386.2542	372.3626	363.5131	348.1163	337.6026	326.4773	327.6198	335.4397	344.4648	361.1972	371.5201	371.5201	(73)

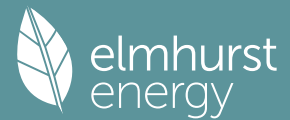
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	432.3869	489.8092	543.5617	625.1013	686.2656	693.1660	661.0138	602.0021	537.4614	466.8720	428.2255	416.6562	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)														
tau	Jan 56.9503	Feb 56.9907	Mar 57.0304	Apr 57.2174	May 57.2525	Jun 57.4166	Jul 57.4166	Aug 57.4471	Sep 57.3533	Oct 57.2525	Nov 57.1815	Dec 57.1075	57.1075	
alpha	4.7967	4.7994	4.8020	4.8145	4.8168	4.8278	4.8278	4.8298	4.8236	4.8168	4.8121	4.8072	4.8072	
util living area	0.9858	0.9734	0.9438	0.8525	0.6882	0.4961	0.3627	0.4145	0.6597	0.8998	0.9719	0.9880	0.9880	(86)

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Living	19.8411	20.0380	20.3303	20.6912	20.9103	20.9846	20.9972	20.9949	20.9447	20.6466	20.1856	19.7993	
Non living	18.6714	18.9191	19.2808	19.7050	19.9317	19.9965	20.0040	20.0036	19.9686	19.6673	19.1097	18.6204	
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	20.4071	20.0380	20.3303	20.6912	20.9103	20.9846	20.9972	20.9949	20.9447	20.6466	20.1856	19.9672 (87)	
Th 2	19.9976	19.9982	19.9988	20.0018	20.0023	20.0049	20.0049	20.0054	20.0039	20.0023	20.0012	20.0001 (88)	
util rest of house													
	0.9818	0.9662	0.9288	0.8177	0.6300	0.4229	0.2816	0.3267	0.5802	0.8669	0.9631	0.9846 (89)	
MIT 2	19.4689	18.9191	19.2808	19.7050	19.9317	19.9965	20.0040	20.0036	19.9686	19.6673	19.1097	18.8690 (90)	
Living area fraction									FLA = Living area / (4) =				0.5000 (91)
MIT	19.9380	19.4785	19.8056	20.1981	20.4210	20.4906	20.5006	20.4992	20.4566	20.1570	19.6476	19.4181 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.9380	19.4785	19.8056	20.1981	20.4210	20.4906	20.5006	20.4992	20.4566	20.1570	19.6476	19.4181 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9816	0.9616	0.9255	0.8251	0.6553	0.4590	0.3221	0.3706	0.6176	0.8727	0.9592	0.9822	(94)
Useful gains	424.4095	471.0184	503.0535	515.7718	449.6857	318.1730	212.9439	223.1170	331.9508	407.4172	410.7580	409.2344	(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													
	863.2041	804.1531	733.4267	620.7349	478.8497	322.5133	213.5629	224.3167	348.4153	524.7511	689.8189	837.7169	(97)
Space heating kWh													
	326.4632	223.8665	171.3976	75.5735	21.6980	0.0000	0.0000	0.0000	0.0000	87.2964	200.9239	318.7910	(98a)
Space heating requirement - total per year (kWh/year)												1426.0100	
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													
	326.4632	223.8665	171.3976	75.5735	21.6980	0.0000	0.0000	0.0000	0.0000	87.2964	200.9239	318.7910	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1426.0100	
Space heating per m2												28.5202	(99)
										(98c) / (4) =			

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 %)													302.0502 (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													
	326.4632	223.8665	171.3976	75.5735	21.6980	0.0000	0.0000	0.0000	0.0000	87.2964	200.9239	318.7910	(98)
Space heating efficiency (main heating system 1)													
	302.0502	302.0502	302.0502	302.0502	302.0502	0.0000	0.0000	0.0000	0.0000	302.0502	302.0502	302.0502	(210)
Space heating fuel (main heating system)													
	108.0824	74.1157	56.7447	25.0202	7.1836	0.0000	0.0000	0.0000	0.0000	28.9013	66.5200	105.5424	(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													
	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052	(64)
Efficiency of water heater													
(217)m	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	(216)
Fuel for water heating, kWh/month													
	73.0349	64.6968	69.3215	63.6220	62.8385	57.1872	56.4695	59.4900	59.1075	64.8706	67.1634	72.9147	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting													
	16.1887	12.9871	11.6935	8.5671	6.6175	5.4066	6.0367	7.8468	10.1922	13.3727	15.1044	16.6386	(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													472.1103 (211)
Space heating fuel - main system 2													0.0000 (213)
Space heating fuel - secondary													0.0000 (215)
Efficiency of water heater													183.6465
Water heating fuel used													770.7167 (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)													130.6518 (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													1852.2425 (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	472.1103	0.1565	73.8625 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	770.7167	0.1403	108.1088 (264)
Energy for instantaneous electric shower(s)	478.7637	0.1391	66.6066 (264a)
Space and water heating			181.9713 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	130.6518	0.1443	18.8571 (268)
Total CO ₂ , kg/year			267.4350 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.3500 (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	472.1103	1.5792	745.5486 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	770.7167	1.5186	1170.4387 (278)
Energy for instantaneous electric shower(s)	478.7637	1.5143	725.0083 (278a)
Space and water heating			1915.9874 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	130.6518	1.5338	200.3981 (282)
Total Primary energy kWh/year			2841.3937 (286)
Dwelling Primary energy Rate (DPER)			56.8300 (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	50.0000 (1b)	x 2.6000 (2b)	= 130.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	130.0000 (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) = 0.1538 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4038 (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) = 0.3433 (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	0.4377	0.4291	0.4205	0.3776	0.3690	0.3261	0.3261	0.3175	0.3433	0.3690	0.3862	0.4033 (22b)
Effective ac	0.5958	0.5921	0.5884	0.5713	0.5681	0.5532	0.5532	0.5504	0.5589	0.5681	0.5746	0.5813 (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							
TER Opening Type			12.5000	1.1450	14.3130		(27)
External Wall 1	62.4000	12.5000	49.9000	0.1800	8.9820		(29a)
External Roof 1	50.0000		50.0000	0.1100	5.5000		(30)
Total net area of external elements A _{um} (A, m ²)			112.4000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.7950		(33)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							226.3400 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

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E7 Party floor between dwellings (in blocks of flats)	24.0000	0.0700	1.6800
E14 Flat roof	24.0000	0.0800	1.9200
E16 Corner (normal)	10.4000	0.0900	0.9360
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.5360 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	33.3310 (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	25.5588	25.3993	25.2429	24.5083	24.3709	23.7311	23.7311	23.6126	23.9775	24.3709	24.6489	24.9396 (38)
Heat transfer coeff	58.8898	58.7302	58.5739	57.8393	57.7019	57.0621	57.0621	56.9436	57.3085	57.7019	57.9799	58.2706 (39)
Average = Sum(39)m / 12 =												57.8386
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1778	1.1746	1.1715	1.1568	1.1540	1.1412	1.1412	1.1389	1.1462	1.1540	1.1596	1.1654 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.6901 (42)
Hot water usage for mixer showers												52.3556 (42a)
Hot water usage for baths												22.6476 (42b)
Hot water usage for other uses												31.9383 (42c)
Average daily hot water use (litres/day)												98.5597 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	107.2197	104.9310	102.1434	97.9036	94.4609	90.7597	89.3366	92.1121	95.0395	98.9252	103.2304	106.9415 (44)
Energy content (annual)	169.8097	149.4203	156.9906	134.0251	127.1626	111.5996	108.0448	114.0541	117.1932	134.2406	147.0706	167.4445 (45)
Distribution loss (46)m = 0.15 x (45)m												1637.0557
Water storage loss:												150.0000 (47)
Store volume												1.3938 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.7527 (55)
Enter (49) or (54) in (55)												
Total storage loss												23.3325 (56)
If cylinder contains dedicated solar storage												23.3325 (57)
Primary loss												23.2624 (59)
Combi loss												0.0000 (61)
Total heat required for water heating calculated for each month												216.4047 (62)
WWHRS												-24.0268 (63a)
PV diverter												-0.0000 (63b)
Solar input												0.0000 (63c)
FGHRS												0.0000 (63d)
Output from w/h												192.3778 (64)
12Total per year (kWh/year)												1962.4258 (64)
Electric shower(s)												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												93.7377 (65)

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

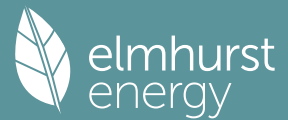
Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	74.2626	82.2193	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	76.7380	74.2626	76.7380	74.2626 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376 (68)
Pumps, fans	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040 (71)
Total internal gains	125.9915	124.0340	120.2625	111.9956	106.9321	101.6394	98.3882	101.0738	104.2225	110.0953	118.0201	124.9344 (72)
	398.8396	406.3666	390.7883	376.8005	358.9151	343.3736	331.1507	332.3085	341.7827	356.3764	377.1230	391.2862 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Northeast	5.9200	11.2829	0.6300	0.7000	0.7700	20.4134 (75)
Southeast	2.0000	36.7938	0.6300	0.7000	0.7700	22.4893 (77)
Northwest	4.5800	11.2829	0.6300	0.7000	0.7700	15.7928 (81)
Solar gains	58.6956	112.0065	185.1961	283.0098	365.8660	384.7171
Total gains	457.5351	518.3731	575.9844	659.8103	724.7811	728.0907
						693.1130
						296.8614
						218.5503
						132.4040
						72.4939
						48.8140 (83)
						440.1002 (84)

7. Mean internal temperature (heating season)

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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	53.3812	53.5263	53.6692	54.3508	54.4802	55.0911	55.0911	55.2057	54.8542	54.4802	54.2190	53.9485
alpha	4.5587	4.5684	4.5779	4.6234	4.6320	4.6727	4.6727	4.6804	4.6569	4.6320	4.6146	4.5966
util living area	0.9834	0.9699	0.9386	0.8455	0.6819	0.4914	0.3602	0.4123	0.6581	0.8953	0.9689	0.9859 (86)
MIT	19.7704	19.9789	20.2876	20.6714	20.9018	20.9828	20.9968	20.9941	20.9382	20.6238	20.1436	19.7408 (87)
Th 2	19.9378	19.9404	19.9429	19.9547	19.9569	19.9673	19.9673	19.9692	19.9633	19.9569	19.9525	19.9478 (88)
util rest of house	0.9788	0.9618	0.9222	0.8090	0.6217	0.4164	0.2767	0.3219	0.5762	0.8608	0.9591	0.9819 (89)
MIT 2	18.5388	18.8019	19.1842	19.6411	19.8802	19.9580	19.9663	19.9671	19.9241	19.6028	19.0206	18.5085 (90)
Living area fraction									fLA = Living area /	(4) =		0.5000 (91)
MIT	19.1546	19.3904	19.7359	20.1563	20.3910	20.4704	20.4815	20.4806	20.4311	20.1133	19.5821	19.1246 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1546	19.3904	19.7359	20.1563	20.3910	20.4704	20.4815	20.4806	20.4311	20.1133	19.5821	19.1246 (93)

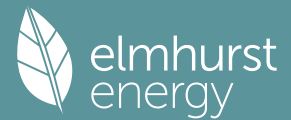
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9745	0.9567	0.9185	0.8166	0.6476	0.4534	0.3185	0.3671	0.6145	0.8666	0.9548	0.9779 (94)
Useful gains	445.8473	495.9089	529.0462	538.8247	469.3971	330.1119	220.7564	230.9755	344.3485	423.5807	429.2781	430.3892 (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	874.7850	851.0247	775.2795	651.0548	501.4870	334.9781	221.4870	232.3647	362.8286	548.9348	723.7097	869.6675 (97)
Space heating kWh	319.1297	238.6378	183.1976	80.8057	23.8749	0.0000	0.0000	0.0000	0.0000	93.2634	211.9907	326.8231 (98a)
Space heating requirement - total per year (kWh/year)												1477.7229
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	319.1297	238.6378	183.1976	80.8057	23.8749	0.0000	0.0000	0.0000	0.0000	93.2634	211.9907	326.8231 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1477.7229
Space heating per m2										(98c) / (4) =		29.5545 (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	319.1297	238.6378	183.1976	80.8057	23.8749	0.0000	0.0000	0.0000	0.0000	93.2634	211.9907	326.8231 (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)	345.7526	258.5458	198.4806	87.5468	25.8666	0.0000	0.0000	0.0000	0.0000	101.0438	229.6757	354.0878 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
Efficiency of water heater (217)m	85.1866	84.8170	84.0827	82.6012	80.8846	79.8000	79.8000	79.8000	79.8000	82.8573	84.5316	79.8000 (216)
Fuel for water heating, kWh/month	225.8310	200.7340	215.6616	194.5396	193.5921	177.9421	176.5248	182.9609	184.3137	196.6192	203.3071	223.3855 (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	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	15.4303	12.3788	11.1457	8.1658	6.3075	5.1533	5.7539	7.4792	9.7147	12.7462	14.3968	15.8592 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-23.8319	-33.8314	-48.9876	-55.5376	-60.3279	-56.5260	-55.8772	-52.5565	-46.7283	-38.9382	-26.3015	-20.5810 (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)	-12.7730	-26.9447	-53.6721	-80.7632	-106.9058	-107.4073	-106.0950	-89.7380	-65.6863	-38.5287	-17.0574	-10.0911 (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												1600.9999 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2375.4116 (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)												124.5314 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1235.6876 (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												

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Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	2951.2553 (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	1600.9999	0.2100	336.2100 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2375.4116	0.2100	498.8364 (264)
Space and water heating			835.0464 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	124.5314	0.1443	17.9737 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.0251	0.1344	-69.8924
PV Unit electricity exported	-715.6625	0.1259	-90.0679
Total			-159.9603 (269)
Total CO2, kg/year			704.9892 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.1000 (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	1600.9999	1.1300	1809.1298 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2375.4116	1.1300	2684.2151 (278)
Space and water heating			4493.3450 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	124.5314	1.5338	191.0104 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.0251	1.4967	-778.3300
PV Unit electricity exported	-715.6625	0.4620	-330.6104
Total			-1108.9404 (283)
Total Primary energy kWh/year			3705.5158 (286)
Target Primary Energy Rate (TPER)			74.1100 (287)

Energy Report



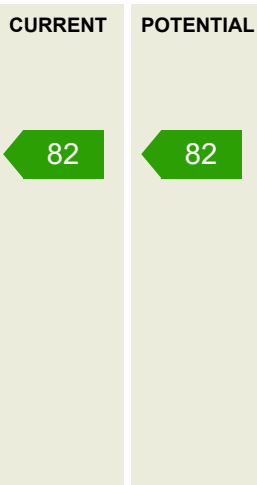
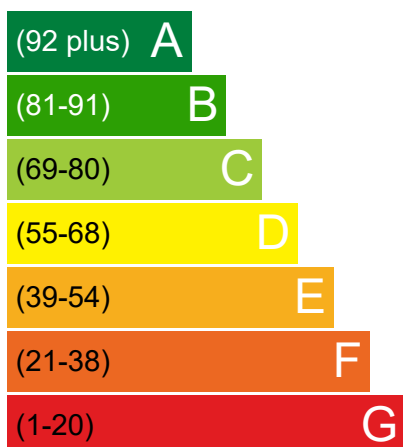
Dwelling Address	
Reference	Block A Flat 4-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	50

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

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

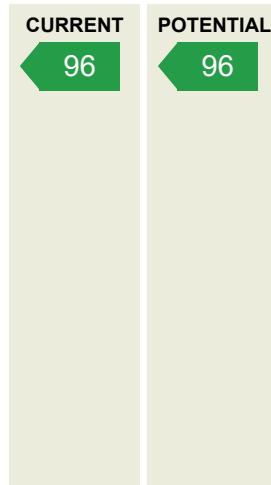
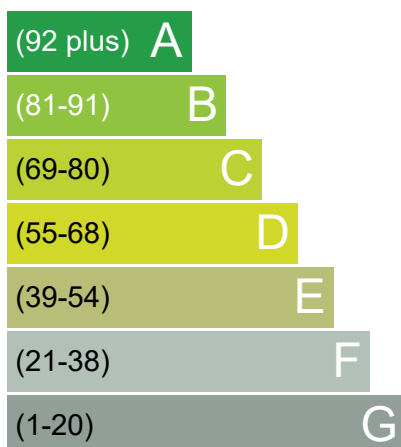
Energy Efficiency Rating

Most energy efficient - lower running costs

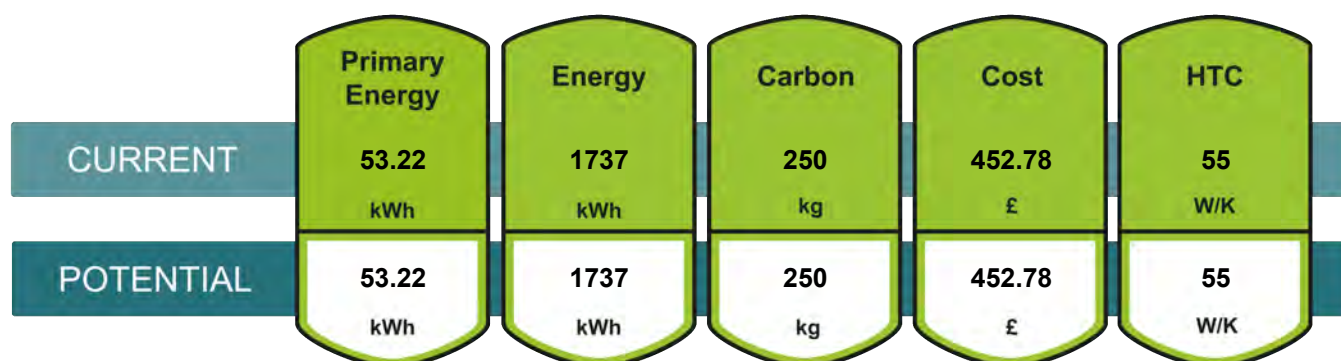


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£34	£34	
Heating		£93	£93	
Hot Water		£326	£326	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£453	£453	

Estimated energy use and potential savings



Space Heating

357
kWh per year



Water Heating

771
kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

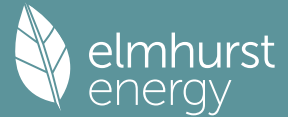
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Full SAP Calculation Printout



Property Reference	Block B Flat 1				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	82 B	DER	4.53	TER	11.73	
Environmental	96 A	% DER < TER				61.38
CO ₂ Emissions (t/year)	0.29	DFEE	33.23	TFEE	35.76	
Compliance Check	See BREL	% DFEE < TFEE				7.10
% DPER < TPER	21.55	DPER	48.04	TPER	61.24	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		
Dwelling volume			

2. Ventilation rate

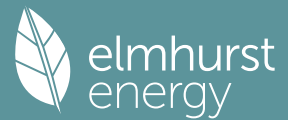
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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	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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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												
Opening Type 1			13.1000	1.3258	17.3674			(27)				
Heatloss Floor 1			70.0000	0.1300	9.1000	110.0000	7700.0000	(28a)				
External Wall 1	72.8000	13.1000	59.7000	0.1800	10.7460	190.0000	11342.9995	(29a)				
Total net area of external elements Aum(A, m2)			142.8000					(31)				
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	37.2134			(33)				
Main dwelling												
Party Ceiling 1			70.0000			20.0000	1400.0000	(32b)				
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		20442.9995	(34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							292.0428	(35)				
List of Thermal Bridges												
K1 Element					Length	Psi-value	Total					
E5 Ground floor (normal)					28.0000	0.0000	0.0000					
E16 Corner (normal)					10.4000	0.0000	0.0000					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								0.0000 (36)				
Point Thermal bridges							(36a) =	0.0000				
Total fabric heat loss						(33) + (36) + (36a) =	37.2134	(37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	31.4408	31.3860	31.3323	31.0801	31.0329	30.8132	30.8132	30.7726	30.8979	31.0329	31.1284	31.2282 (38)
Heat transfer coeff	68.6542	68.5995	68.5458	68.2935	68.2464	68.0267	68.0267	67.9860	68.1113	68.2464	68.3418	68.4416 (39)
Average = Sum(39)m / 12 =												68.2933
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9808	0.9800	0.9792	0.9756	0.9749	0.9718	0.9718	0.9712	0.9730	0.9749	0.9763	0.9777 (40)
HLP (average)												0.9756
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2461 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	26.1376	25.7430	25.1817	24.3411	23.5836	22.5407	21.7495	22.7170	23.2247	24.2581	25.3324	26.1169 (42b)
Hot water usage for other uses	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326 (42c)
Average daily hot water use (litres/day)												58.4472 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	63.7702	62.0071	60.0774	57.8683	55.7423	53.3310	52.5398	54.8757	56.7519	59.1537	61.5965	63.7494 (44)
Energy conte	93.8807	82.0480	85.8493	75.5905	71.8296	61.6755	58.0580	64.5897	65.8294	76.2256	83.2498	93.6207 (45)
Energy content (annual)										Total = Sum(45)m =		912.4468
Distribution loss (46)m = 0.15 x (45)m	14.0821	12.3072	12.8774	11.3386	10.7744	9.2513	8.7087	9.6885	9.8744	11.4338	12.4875	14.0431 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195 (64)
								Total per year (kWh/year) = Sum(64)m =				1552.9488 (64)
12Total per year (kWh/year)												1553 (64)
Electric shower(s)	49.5554	44.1543	48.2148	46.0108	46.8741	44.7134	46.2038	46.8741	46.0108	48.2148	47.3081	49.5554 (64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				563.6896 (64a)
Heat gains from water heating, kWh/month	87.1232	77.6270	84.1176	78.7517	79.1209	73.8006	74.3743	76.7137	75.5062	80.9177	81.6228	87.0368 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306 (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)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450 (71)
Water heating gains (Table 5)	117.1011	115.5164	113.0613	109.3774	106.3453	102.5009	99.9654	103.1098	104.8697	108.7604	113.3650	116.9849 (72)
Total internal gains	472.1333	483.4221	464.9817	453.6826	433.4179	419.9110	405.3021	406.3991	416.6863	428.1923	450.0294	463.3119 (73)

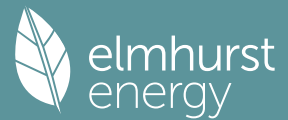
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W			
Northeast				6.2000	11.2829	0.3500	0.0000	0.7700	18.8527 (75)			
Southeast				2.1000	36.7938	0.3500	0.0000	0.7700	20.8235 (77)			
Northwest				4.8000	11.2829	0.3500	0.0000	0.7700	14.5956 (81)			
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	526.4051	586.9771	636.1808	715.2708	771.5672	775.4744	739.8386	680.7815	618.7081	550.5994	517.0577	508.4480 (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 from living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	82.7132	82.7792	82.8441	83.1500	83.2075	83.4762	83.4762	83.5262	83.3725	83.2075	83.0913	82.9701
alpha	6.5142	6.5186	6.5229	6.5433	6.5472	6.5651	6.5651	6.5684	6.5582	6.5472	6.5394	6.5313
util living area	0.9966	0.9923	0.9797	0.9212	0.7699	0.5558	0.4039	0.4579	0.7252	0.9501	0.9914	0.9973 (86)

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Living	20.1359	20.2746	20.4849	20.7672	20.9434	20.9939	20.9993	20.9986	20.9704	20.7404	20.3919	20.1065
Non living	19.0996	19.2764	19.5411	19.8804	20.0621	20.1040	20.1067	20.1070	20.0887	19.8577	19.4287	19.0641
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	20.5579	20.2746	20.4849	20.7672	20.9434	20.9939	20.9993	20.9986	20.9704	20.7404	20.3919	20.2314 (87)
Th 2	20.0994	20.1000	20.1007	20.1037	20.1043	20.1069	20.1069	20.1074	20.1059	20.1043	20.1031	20.1019 (88)
util rest of house												
MIT 2	0.9953	0.9895	0.9722	0.8948	0.7127	0.4810	0.3223	0.3699	0.6456	0.9272	0.9877	0.9963 (89)
Living area fraction	19.7008	19.2764	19.5411	19.8804	20.0621	20.1040	20.1067	20.1070	20.0887	19.8577	19.4287	19.2511 (90)
MIT	20.0314	19.6614	19.9051	20.2224	20.4020	20.4472	20.4510	20.4509	20.4288	20.1982	19.8002	19.6292 (91)
Temperature adjustment												0.0000
adjusted MIT	20.0314	19.6614	19.9051	20.2224	20.4020	20.4472	20.4510	20.4509	20.4288	20.1982	19.8002	19.6292 (93)

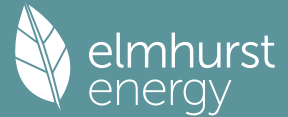
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9952	0.9878	0.9702	0.8987	0.7326	0.5098	0.3538	0.4039	0.6756	0.9300	0.9861	0.9956 (94)
Useful gains	523.8939	579.8043	617.1991	642.8211	565.2675	395.3326	261.7865	274.9723	417.9897	512.0518	509.8473	506.2113 (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	1080.0284	1012.6268	918.8620	773.2494	593.8819	397.7678	261.9720	275.4025	431.0624	655.0421	867.9555	1056.0021 (97)
Space heating kWh	413.7641	290.8567	224.4372	93.9084	21.2891	0.0000	0.0000	0.0000	0.0000	106.3848	257.8379	409.0444 (98a)
Space heating requirement - total per year (kWh/year)												1817.5226
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	413.7641	290.8567	224.4372	93.9084	21.2891	0.0000	0.0000	0.0000	0.0000	106.3848	257.8379	409.0444 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1817.5226
Space heating per m2										(98c) / (4) =		25.9646 (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 %)												306.0519 (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	413.7641	290.8567	224.4372	93.9084	21.2891	0.0000	0.0000	0.0000	0.0000	106.3848	257.8379	409.0444 (98)
Space heating efficiency (main heating system 1)	306.0519	306.0519	306.0519	306.0519	306.0519	0.0000	0.0000	0.0000	0.0000	306.0519	306.0519	306.0519 (210)
Space heating fuel (main heating system)	135.1941	95.0351	73.3331	30.6838	6.9560	0.0000	0.0000	0.0000	0.0000	34.7604	84.2465	133.6520 (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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195 (64)
Efficiency of water heater (217)m	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275 (216)
Fuel for water heating, kWh/month	80.1392	70.8989	75.7985	69.3056	68.2214	61.7851	60.7784	64.3086	64.0302	70.5973	73.4452	79.9987 (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	23.9244	19.1931	17.2812	12.6610	9.7797	7.9901	8.9214	11.5963	15.0625	19.7628	22.3220	24.5894 (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												593.8610 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												185.0275
Water heating fuel used												839.3070 (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)												193.0839 (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												2189.9415 (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	593.8610	0.1566	93.0021 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	839.3070	0.1404	117.8257 (264)
Energy for instantaneous electric shower(s)	563.6896	0.1391	78.4217 (264a)
Space and water heating			210.8278 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	193.0839	0.1443	27.8680 (268)
Total CO2, kg/year			317.1175 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5300 (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	593.8610	1.5798	938.1614 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	839.3070	1.5191	1274.9612 (278)
Energy for instantaneous electric shower(s)	563.6896	1.5143	853.6145 (278a)
Space and water heating			2213.1226 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	193.0839	1.5338	296.1585 (282)
Total Primary energy kWh/year			3362.8956 (286)
Dwelling Primary energy Rate (DPER)			48.0400 (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	70.0000 (1b)	x 2.6000 (2b)	= 182.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	182.0000 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1099 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3599 (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) = 0.3059 (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	0.3900	0.3824	0.3747	0.3365	0.3288	0.2906	0.2906	0.2830	0.3059	0.3288	0.3441	0.3594 (22b)
Effective ac	0.5761	0.5731	0.5702	0.5566	0.5541	0.5422	0.5422	0.5400	0.5468	0.5541	0.5592	0.5646 (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 Opening Type			13.1000	1.1450	15.0000		(27)
Heatloss Floor 1			70.0000	0.1300	9.1000		(28a)
External Wall 1	72.8000	13.1000	59.7000	0.1800	10.7460		(29a)
Total net area of external elements Aum (A, m2)			142.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.8460		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							302.0428 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000
0.0900
0.9360
5.4160 (36)
0.0000
(33) + (36) + (36a) = 40.2620 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m
Heat transfer coeff
Average = Sum(39)m / 12 =

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0694	1.0669	1.0644	1.0527	1.0506	1.0404	1.0404	1.0385	1.0443	1.0506	1.0550	1.0596
HLP (average)												1.0527
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy
Hot water usage for mixer showers
Hot water usage for baths
Hot water usage for other uses
Average daily hot water use (litres/day)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	126.2459	123.5505	120.2678	115.2758	111.2220	106.8639	105.1887	108.4572	111.9043	116.4797	121.5487	125.9184
Energy conte	199.9426	175.9342	184.8472	157.8067	149.7262	131.4016	127.2166	134.2926	137.9892	158.0618	173.1684	197.1578
Energy content (annual)												1927.5450
Distribution loss (46)m = 0.15 x (45)m	29.9914	26.3901	27.7271	23.6710	22.4589	19.7102	19.0825	20.1439	20.6984	23.7093	25.9753	29.5737
Water storage loss:												150.0000
Store volume												1.3938
a) If manufacturer declared loss factor is known (kWh/day):												0.5400
Temperature factor from Table 2b												0.7527
Enter (49) or (54) in (55)												
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325
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
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
Total heat required for water heating calculated for each month	246.5375	218.0199	231.4421	202.8986	196.3211	176.4934	173.8115	180.8875	183.0811	204.6567	218.2602	243.7527
WWHRS	-28.2888	-25.0189	-26.1983	-21.6933	-20.2173	-17.3001	-16.2161	-17.2442	-17.8994	-21.1014	-23.9053	-27.7650
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
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
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
Output from w/h	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878
12Total per year (kWh/year)												2213.3143
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
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000
Heat gains from water heating, kWh/month	103.7568	92.1667	98.7376	88.5442	87.0599	79.7645	79.5754	81.9282	81.9549	89.8315	93.6520	102.8309

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabolic gains	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062
Lighting gains	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433
Appliances gains	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918
Cooking gains	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Losses e.g. evaporation	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450
Water heating gains	139.4581	137.1528	132.7118	122.9781	117.0160	110.7840	106.9562	110.1186	113.8262	120.7412	130.0722	138.2136
Total internal gains	497.4904	508.0585	487.6322	470.2832	447.0886	428.1941	412.2929	413.4079	425.6429	443.1731	469.7366	487.5406

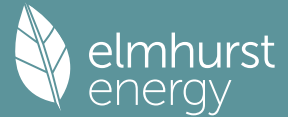
6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Northeast	6.2000	11.2829	0.6300	0.7000	0.7700	21.3789
Southeast	2.1000	36.7938	0.6300	0.7000	0.7700	23.6138
Northwest	4.8000	11.2829	0.6300	0.7000	0.7700	16.5514
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089
Total gains	559.0345	625.4899	681.7720	766.9243	830.5499	831.4030

7. Mean internal temperature (heating season)

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

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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	78.4536	78.6399	78.8234	79.6970	79.8626	80.6426	80.6426	80.7887	80.3404	79.8626	79.5283	79.1818	
alpha	6.2302	6.2427	6.2549	6.3131	6.3242	6.3762	6.3762	6.3859	6.3560	6.3242	6.3019	6.2788	
util living area	0.9963	0.9918	0.9785	0.9191	0.7674	0.5544	0.4040	0.4597	0.7309	0.9509	0.9912	0.9971	(86)
MIT	20.0768	20.2246	20.4492	20.7506	20.9378	20.9931	20.9992	20.9983	20.9654	20.7176	20.3519	20.0544	(87)
Th 2	20.0259	20.0280	20.0300	20.0396	20.0414	20.0498	20.0498	20.0514	20.0466	20.0414	20.0378	20.0340	(88)
util rest of house	0.9949	0.9887	0.9702	0.8908	0.7067	0.4751	0.3172	0.3660	0.6466	0.9270	0.9872	0.9959	(89)
MIT 2	18.9645	19.1537	19.4372	19.8036	19.9960	20.0466	20.0496	20.0509	20.0270	19.7760	19.3241	18.9422	(90)
Living area fraction										FLA = Living area / (4) =		0.3857	(91)
MIT	19.3936	19.5668	19.8275	20.1689	20.3593	20.4117	20.4159	20.4163	20.3890	20.1392	19.7205	19.3712	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.3936	19.5668	19.8275	20.1689	20.3593	20.4117	20.4159	20.4163	20.3890	20.1392	19.7205	19.3712	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9937	0.9868	0.9681	0.8951	0.7278	0.5057	0.3508	0.4022	0.6783	0.9299	0.9855	0.9949	(94)
Useful gains	555.4894	617.2266	660.0156	686.4612	604.4939	420.4275	277.6757	291.4447	444.1089	541.1591	537.8303	535.9584	(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	1129.9091	1095.3563	993.0206	830.4288	636.7995	423.2526	277.9034	291.9709	459.7390	701.5071	932.0074	1125.2717	(97)
Space heating kWh	427.3683	321.3032	247.7557	103.6566	24.0353	0.0000	0.0000	0.0000	0.0000	119.2989	283.8075	438.4491	(98a)
Space heating requirement - total per year (kWh/year)												1965.6746	
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	427.3683	321.3032	247.7557	103.6566	24.0353	0.0000	0.0000	0.0000	0.0000	119.2989	283.8075	438.4491	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1965.6746	
Space heating per m2										(98c) / (4) =		28.0811	(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	427.3683	321.3032	247.7557	103.6566	24.0353	0.0000	0.0000	0.0000	0.0000	119.2989	283.8075	438.4491	(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)	463.0209	348.1074	268.4244	112.3041	26.0405	0.0000	0.0000	0.0000	0.0000	129.2513	307.4837	475.0261	(211)	
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)	
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)	
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)	
Water heating														
Water heating requirement	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878	(64)	
Efficiency of water heater (217)m	85.5388	85.1943	84.4830	82.8557	80.7833	79.8000	79.8000	79.8000	79.8000	83.1184	84.9077	79.8000	(216)	
Fuel for water heating, kWh/month	255.1459	226.5422	242.9408	218.6998	217.9954	199.4903	197.4880	205.0668	206.9946	220.8360	228.9014	252.2830	(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	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	20.9948	16.8428	15.1651	11.1106	8.5821	7.0117	7.8289	10.1763	13.2180	17.3428	19.5886	21.5783	(232)	
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-32.8701	-46.4063	-66.8089	-75.2540	-81.2811	-75.9327	-75.0050	-70.7452	-63.2427	-53.1331	-36.1640	-28.4114	(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	-18.3768	-38.6803	-76.9148	-115.5671	-152.8459	-153.5740	-151.7560	-128.4671	-94.1378	-55.3206	-24.5385	-14.5294	(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												2129.6583	(211)	
Space heating fuel - main system 2												0.0000	(213)	
Space heating fuel - secondary												0.0000	(215)	
Efficiency of water heater												79.8000		
Water heating fuel used												2672.3842	(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)												169.4401	(232)	
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation												-1729.9627	(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)	

Full SAP Calculation Printout



Total delivered energy for all uses

3327.5199 (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	2129.6583	0.2100	447.2282 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2672.3842	0.2100	561.2007 (264)
Space and water heating			1008.4289 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	169.4401	0.1443	24.4554 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	0.1345	-94.8895
PV Unit electricity exported	-1024.7084	0.1259	-128.9966
Total			-223.8861 (269)
Total CO2, kg/year			820.9275 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.7300 (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	2129.6583	1.1300	2406.5139 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2672.3842	1.1300	3019.7941 (278)
Space and water heating			5426.3080 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	169.4401	1.5338	259.8929 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	1.4973	-1055.9481
PV Unit electricity exported	-1024.7084	0.4621	-473.5061
Total			-1529.4542 (283)
Total Primary energy kWh/year			4286.8475 (286)
Target Primary Energy Rate (TPER)			61.2400 (287)

Energy Report



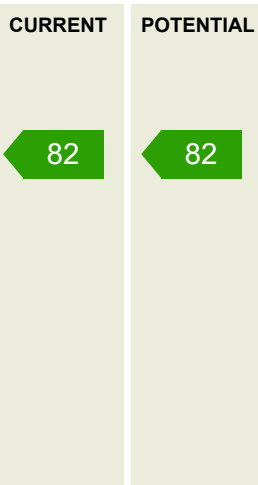
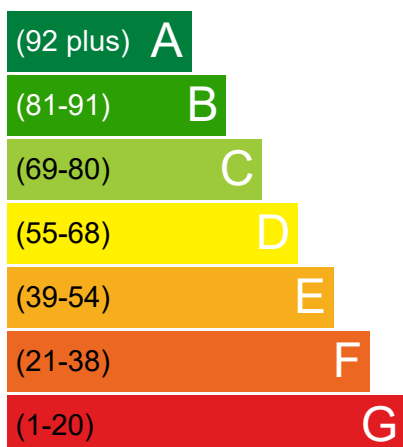
Dwelling Address	
Reference	Block B Flat 1-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

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

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

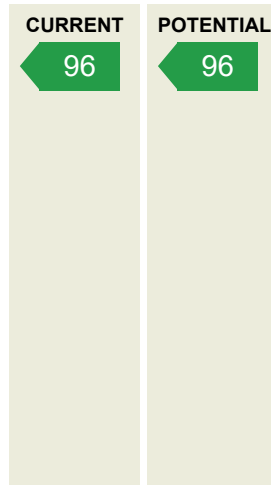
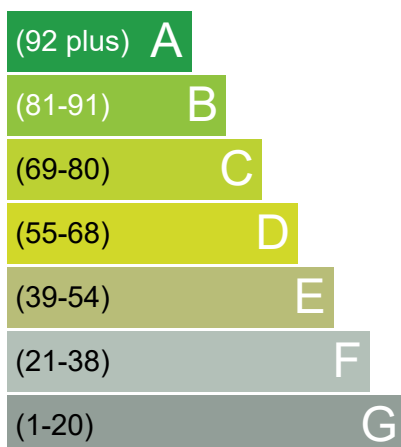
Energy Efficiency Rating

Most energy efficient - lower running costs

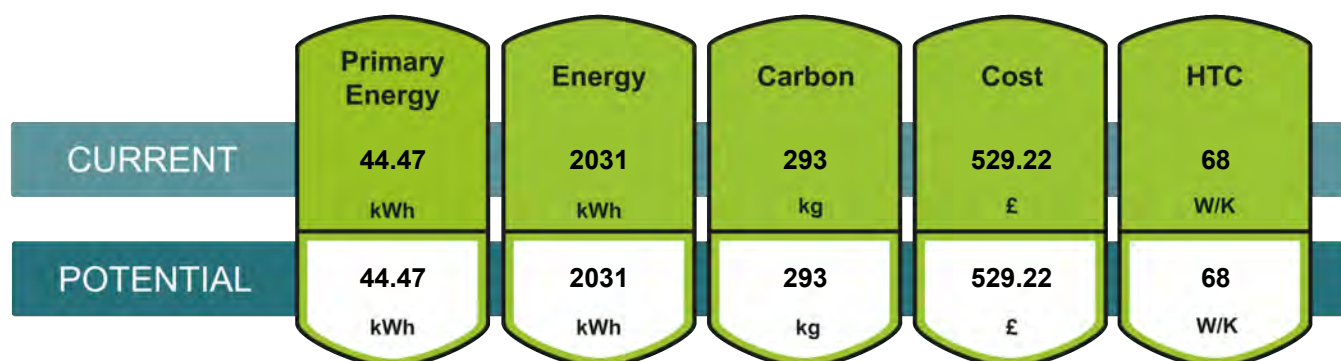


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£50	£50	
Heating		£113	£113	
Hot Water		£366	£366	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£529	£529	

Estimated energy use and potential savings



Space Heating

435

kWh per year



Water Heating

839

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

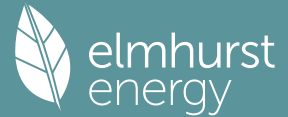
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block B Flat 2				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	82 B	DER	5.33	TER	14.32	
Environmental	96 A	% DER < TER				62.78
CO ₂ Emissions (t/year)	0.25	DFEE	38.01	TFEE	40.37	
Compliance Check	See BREL	% DFEE < TFEE				5.84
% DPER < TPER	24.87	DPER	56.58	TPER	75.31	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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	50.0000 (1b)	2.6000 (2b)	130.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		130.0000 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	130.0000 (5)

2. Ventilation rate

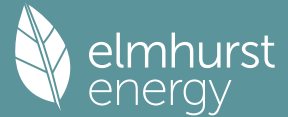
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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												
Opening Type 1			13.1000	1.3258	17.3674			(27)				
Heatloss Floor 1			50.0000	0.1300	6.5000	110.0000	5500.0000	(28a)				
External Wall 1	62.4000	13.1000	49.3000	0.1800	8.8740	190.0000	9366.9996	(29a)				
Total net area of external elements Aum(A, m2)			112.4000					(31)				
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.7414			(33)				
Main dwelling												
Party Ceiling 1			50.0000			20.0000	1000.0000	(32b)				
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		15866.9996	(34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							317.3400	(35)				
List of Thermal Bridges												
K1 Element				Length	Psi-value	Total						
E5 Ground floor (normal)				24.0000	0.0000	0.0000						
E16 Corner (normal)				10.4000	0.0000	0.0000						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000	(36)				
Point Thermal bridges						(36a) =	0.0000					
Total fabric heat loss						(33) + (36) + (36a) =	32.7414	(37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	22.4577	22.4186	22.3802	22.2001	22.1664	22.0095	22.0095	21.9804	22.0699	22.1664	22.2346	22.3059 (38)
Heat transfer coeff	55.1992	55.1600	55.1217	54.9415	54.9078	54.7509	54.7509	54.7218	54.8113	54.9078	54.9760	55.0473 (39)
Average = Sum(39)m / 12 =												54.9413
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1040	1.1032	1.1024	1.0988	1.0982	1.0950	1.0950	1.0944	1.0962	1.0982	1.0995	1.1009 (40)
HLP (average)												1.0988
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.6901 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	22.2178	21.8825	21.4053	20.6908	20.0468	19.1604	18.4878	19.3102	19.7418	20.6202	21.5334	22.2002 (42b)
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383 (42c)
Average daily hot water use (litres/day)												49.6360 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	54.1562	52.6594	51.0209	49.1449	47.3396	45.2917	44.6192	46.6030	48.1960	50.2357	52.3103	54.1385 (44)
Energy conte	79.7272	69.6790	72.9078	64.1956	61.0018	52.3784	49.3055	54.8525	55.9049	64.7338	70.6992	79.5064 (45)
Energy content (annual)										Total = Sum(45)m =		774.8921
Distribution loss (46)m = 0.15 x (45)m	11.9591	10.4519	10.9362	9.6293	9.1503	7.8568	7.3958	8.2279	8.3857	9.7101	10.6049	11.9260 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052 (64)
										Total per year (kWh/year) = Sum(64)m =		1415.3941 (64)
12Total per year (kWh/year)												1415 (64)
Electric shower(s)	42.0893	37.5019	40.9507	39.0787	39.8120	37.9768	39.2427	39.8120	39.0787	40.9507	40.1807	42.0893 (64a)
												Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =
Heat gains from water heating, kWh/month	80.5507	71.8513	77.9985	73.2299	73.7552	69.0252	69.7238	71.7105	70.4733	75.2807	75.6678	80.4773 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	74.2626	82.2193	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	76.7380	74.2626	76.7380	74.2626 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505 (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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040 (71)
Water heating gains (Table 5)	108.2670	106.9215	104.8367	101.7082	99.1333	95.8683	93.7148	96.3851	97.8795	101.1837	105.0942	108.1684 (72)
Total internal gains	378.1151	386.2542	372.3626	363.5131	348.1163	337.6026	326.4773	327.6198	335.4397	344.4648	361.1972	371.5201 (73)

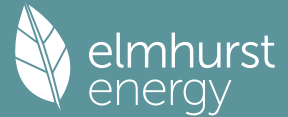
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	432.3869	489.8092	543.5617	625.1013	686.2656	693.1660	661.0138	602.0021	537.4614	466.8720	428.2255	416.6562	(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	79.8472	79.9039	79.9595	80.2217	80.2709	80.5010	80.5010	80.5437	80.4122	80.2709	80.1714	80.0675
alpha	6.3231	6.3269	6.3306	6.3481	6.3514	6.3667	6.3667	6.3696	6.3608	6.3514	6.3448	6.3378
util living area	0.9956	0.9895	0.9704	0.8890	0.7112	0.5022	0.3641	0.4172	0.6796	0.9343	0.9887	0.9965 (86)

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Living	20.1254	20.2819	20.5161	20.8057	20.9598	20.9960	20.9996	20.9990	20.9769	20.7598	20.3930	20.0926
Non living	19.0000	19.1984	19.4898	19.8265	19.9750	20.0032	20.0048	20.0051	19.9919	19.7863	19.3428	18.9601
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	20.5526	20.2819	20.5161	20.8057	20.9598	20.9960	20.9996	20.9990	20.9769	20.7598	20.3930	20.2195 (87)
Th 2	19.9976	19.9982	19.9988	20.0018	20.0023	20.0049	20.0049	20.0054	20.0039	20.0023	20.0012	20.0001 (88)
util rest of house												
	0.9938	0.9854	0.9590	0.8531	0.6468	0.4258	0.2820	0.3275	0.5924	0.9033	0.9835	0.9951 (89)
MIT 2	19.5999	19.1984	19.4898	19.8265	19.9750	20.0032	20.0048	20.0051	19.9919	19.7863	19.3428	19.1475 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	20.0762	19.7401	20.0030	20.3161	20.4674	20.4996	20.5022	20.5021	20.4844	20.2730	19.8679	19.6835 (91)
Temperature adjustment												0.0000
adjusted MIT	20.0762	19.7401	20.0030	20.3161	20.4674	20.4996	20.5022	20.5021	20.4844	20.2730	19.8679	19.6835 (93)

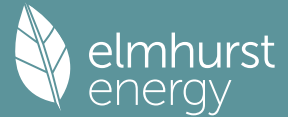
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9939	0.9840	0.9590	0.8654	0.6777	0.4641	0.3230	0.3724	0.6356	0.9129	0.9826	0.9945 (94)
Useful gains	429.7699	481.9940	521.2940	540.9417	465.0772	321.6672	213.5390	224.2092	341.6178	426.2132	420.7675	414.3619 (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	870.8354	818.5815	744.3068	627.2181	481.3977	323.0068	213.6480	224.4722	349.9389	531.1247	701.9281	852.3238 (97)
Space heating kWh	328.1528	226.1868	165.9215	62.1190	12.1425	0.0000	0.0000	0.0000	0.0000	78.0541	202.4356	325.8436 (98a)
Space heating requirement - total per year (kWh/year)												1400.8560
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	328.1528	226.1868	165.9215	62.1190	12.1425	0.0000	0.0000	0.0000	0.0000	78.0541	202.4356	325.8436 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1400.8560
Space heating per m2										(98c) / (4) =		28.0171 (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 %)												302.0502 (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	328.1528	226.1868	165.9215	62.1190	12.1425	0.0000	0.0000	0.0000	0.0000	78.0541	202.4356	325.8436 (98)
Space heating efficiency (main heating system 1)	302.0502	302.0502	302.0502	302.0502	302.0502	0.0000	0.0000	0.0000	0.0000	302.0502	302.0502	302.0502 (210)
Space heating fuel (main heating system)	108.6418	74.8838	54.9318	20.5658	4.0200	0.0000	0.0000	0.0000	0.0000	25.8414	67.0205	107.8773 (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	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052 (64)
Efficiency of water heater (217)m	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465 (216)
Fuel for water heating, kWh/month	73.0349	64.6968	69.3215	63.6220	62.8385	57.1872	56.4695	59.4900	59.1075	64.8706	67.1634	72.9147 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)
Lighting	16.1887	12.9871	11.6935	8.5671	6.6175	5.4066	6.0367	7.8468	10.1922	13.3727	15.1044	16.6386 (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												463.7825 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												183.6465
Water heating fuel used												770.7167 (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)												130.6518 (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												1843.9147 (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	463.7825	0.1569	72.7847 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	770.7167	0.1403	108.1088 (264)
Energy for instantaneous electric shower(s)	478.7637	0.1391	66.6066 (264a)
Space and water heating			180.8934 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	130.6518	0.1443	18.8571 (268)
Total CO2, kg/year			266.3571 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.3300 (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	463.7825	1.5810	733.2293 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	770.7167	1.5186	1170.4387 (278)
Energy for instantaneous electric shower(s)	478.7637	1.5143	725.0083 (278a)
Space and water heating			1903.6680 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	130.6518	1.5338	200.3981 (282)
Total Primary energy kWh/year			2829.0744 (286)
Dwelling Primary energy Rate (DPER)			56.5800 (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	50.0000 (1b)	x 2.6000 (2b)	= 130.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	130.0000 (5)

2. Ventilation rate

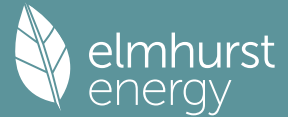
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1538 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4038 (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) = 0.3433 (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	0.4377	0.4291	0.4205	0.3776	0.3690	0.3261	0.3261	0.3175	0.3433	0.3690	0.3862	0.4033 (22b)
Effective ac	0.5958	0.5921	0.5884	0.5713	0.5681	0.5532	0.5532	0.5504	0.5589	0.5681	0.5746	0.5813 (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 Opening Type			12.5000	1.1450	14.3130		(27)
Heatloss Floor 1			50.0000	0.1300	6.5000		(28a)
External Wall 1	62.4000	12.5000	49.9000	0.1800	8.9820		(29a)
Total net area of external elements Aum(A, m2)			112.4000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		29.7950		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							327.3400 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				24.0000	0.1600	3.8400	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000 0.0900 0.9360

4.7760 (36)
0.0000
(33) + (36) + (36a) = 34.5710 (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	25.5588	25.3993	25.2429	24.5083	24.3709	23.7311	23.7311	23.6126	23.9775	24.3709	24.6489	24.9396 (38)
Heat transfer coeff	60.1298	59.9702	59.8139	59.0793	58.9419	58.3021	58.3021	58.1836	58.5485	58.9419	59.2199	59.5106 (39)
Average = Sum(39)m / 12 =												59.0786

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2026	1.1994	1.1963	1.1816	1.1788	1.1660	1.1660	1.1637	1.1710	1.1788	1.1844	1.1902 (40)
HLP (average)												1.1816
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy
Hot water usage for mixer showers
Hot water usage for baths
Hot water usage for other uses
Average daily hot water use (litres/day)

1.6901 (42)

52.5569	51.7671	50.6162	48.4141	46.7890	44.9767	43.9465	45.0888	46.3409	48.2867	50.5361	52.3556 (42a)
22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476 (42b)
31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383 (42c)
											98.5597 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	107.2197	104.9310	102.1434	97.9036	94.4609	90.7597	89.3366	92.1121	95.0395	98.9252	103.2304	106.9415 (44)
Energy conte	169.8097	149.4203	156.9906	134.0251	127.1626	111.5996	108.0448	114.0541	117.1932	134.2406	147.0706	167.4445 (45)
Energy content (annual)												1637.0557
Distribution loss (46)m = 0.15 x (45)m	25.4715	22.4130	23.5486	20.1038	19.0744	16.7399	16.2067	17.1081	17.5790	20.1361	22.0606	25.1167 (46)
Water storage loss:												150.0000 (47)
Store volume												1.3938 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.7527 (55)
Enter (49) or (54) in (55)												
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (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	216.4047	191.5060	203.5855	179.1170	173.7575	156.6915	154.6398	160.6490	162.2850	180.8355	192.1624	214.0394 (62)
WWHRS	-24.0268	-21.2495	-22.2513	-18.4249	-17.1714	-14.6937	-13.7730	-14.6462	-15.2026	-17.9222	-20.3037	-23.5819 (63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
12Total per year (kWh/year)												1962.4258 (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	93.7377	83.3508	89.4753	80.6368	79.5575	73.1803	73.2008	75.1989	75.0402	81.9109	84.9744	92.9512 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	74.2626	82.2193	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	76.7380	74.2626	76.7380	74.2626 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505 (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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040 (71)
Water heating gains (Table 5)	125.9915	124.0340	120.2625	111.9956	106.9321	101.6394	98.3882	101.0738	104.2225	110.0953	118.0201	124.9344 (72)
Total internal gains	398.8396	406.3666	390.7883	376.8005	358.9151	343.3736	331.1507	332.3085	341.7827	356.3764	377.1230	391.2862 (73)

6. Solar gains

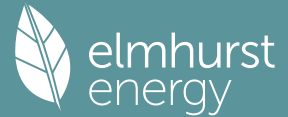
[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	5.9200	11.2829	0.6300	0.7000	0.7700	20.4134 (75)						
Southeast	2.0000	36.7938	0.6300	0.7000	0.7700	22.4893 (77)						
Northwest	4.5800	11.2829	0.6300	0.7000	0.7700	15.7928 (81)						
Solar gains	58.6956	112.0065	185.1961	283.0098	365.8660	384.7171	361.9623	296.8614	218.5503	132.4040	72.4939	48.8140 (83)
Total gains	457.5351	518.3731	575.9844	659.8103	724.7811	728.0907	693.1130	629.1699	560.3330	488.7804	449.6169	440.1002 (84)

7. Mean internal temperature (heating season)

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

21.0000 (85)

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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	75.6096	75.8107	76.0090	76.9540	77.1334	77.9799	77.9799	78.1387	77.6517	77.1334	76.7713	76.3963
alpha	6.0406	6.0540	6.0673	6.1303	6.1422	6.1987	6.1987	6.2092	6.1768	6.1422	6.1181	6.0931
util living area	0.9953	0.9891	0.9703	0.8917	0.7179	0.5085	0.3696	0.4242	0.6915	0.9371	0.9886	0.9962 (86)
MIT	20.0618	20.2256	20.4723	20.7831	20.9523	20.9950	20.9994	20.9987	20.9716	20.7342	20.3510	20.0387 (87)
Th 2	19.9179	19.9205	19.9230	19.7838	19.9370	19.9473	19.9473	19.9492	19.9433	19.9370	19.9325	19.9278 (88)
util rest of house	0.9933	0.9847	0.9583	0.8545	0.6498	0.4269	0.2815	0.3280	0.5989	0.9055	0.9831	0.9946 (89)
MIT 2	18.8548	19.0639	19.3721	19.7409	19.9050	19.9452	19.9471	19.9489	19.9289	19.6998	19.2333	18.8330 (90)
Living area fraction									FLA = Living area / (4) =			0.5000 (91)
MIT	19.4583	19.6447	19.9222	20.2620	20.4287	20.4701	20.4733	20.4738	20.4503	20.2170	19.7921	19.4358 (92)
Temperature adjustment												0.0000
adjusted MIT	19.4583	19.6447	19.9222	20.2620	20.4287	20.4701	20.4733	20.4738	20.4503	20.2170	19.7921	19.4358 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9922	0.9833	0.9583	0.8670	0.6824	0.4677	0.3256	0.3762	0.6448	0.9151	0.9822	0.9937 (94)
Useful gains	453.9623	509.7147	551.9846	572.0811	494.5720	340.5481	225.6744	236.6825	361.3178	447.2877	441.6204	437.3144 (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	911.4675	884.2458	802.8340	671.2603	514.4837	342.2393	225.8202	237.0271	371.7996	566.8438	751.6271	906.6912 (97)
Space heating kWh	340.3839	251.6849	186.6319	71.4090	14.8142	0.0000	0.0000	0.0000	0.0000	88.9498	223.2048	349.2163 (98a)
Space heating requirement - total per year (kWh/year)												1526.2949
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	340.3839	251.6849	186.6319	71.4090	14.8142	0.0000	0.0000	0.0000	0.0000	88.9498	223.2048	349.2163 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1526.2949
Space heating per m2										(98c) / (4) =		30.5259 (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	340.3839	251.6849	186.6319	71.4090	14.8142	0.0000	0.0000	0.0000	0.0000	88.9498	223.2048	349.2163 (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)	368.7799	272.6814	202.2014	77.3662	16.0501	0.0000	0.0000	0.0000	0.0000	96.3703	241.8254	378.3492 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
Efficiency of water heater (217)m	85.3251	84.9348	84.1244	82.3684	80.5052	79.8000	79.8000	79.8000	79.8000	82.7624	84.6471	79.8000 (216)
Fuel for water heating, kWh/month	225.4644	200.4556	215.5547	195.0894	194.5043	177.9421	176.5248	182.9609	184.3137	196.8446	203.0297	223.0159 (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	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	15.4303	12.3788	11.1457	8.1658	6.3075	5.1533	5.7539	7.4792	9.7147	12.7462	14.3968	15.8592 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-23.8319	-33.8314	-48.9876	-55.5376	-60.3279	-56.5260	-55.8772	-52.5565	-46.7283	-38.9382	-26.3015	-20.5810 (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	-12.7730	-26.9447	-53.6721	-80.7632	-106.9058	-107.4073	-106.0950	-89.7380	-65.6863	-38.5287	-17.0574	-10.0911 (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												1653.6240 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2375.7001 (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)												124.5314 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1235.6876 (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

3004.1678 (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	1653.6240	0.2100	347.2610 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2375.7001	0.2100	498.8970 (264)
Space and water heating			846.1581 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	124.5314	0.1443	17.9737 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.0251	0.1344	-69.8924
PV Unit electricity exported	-715.6625	0.1259	-90.0679
Total			-159.9603 (269)
Total CO2, kg/year			716.1008 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.3200 (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	1653.6240	1.1300	1868.5951 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2375.7001	1.1300	2684.5411 (278)
Space and water heating			4553.1362 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	124.5314	1.5338	191.0104 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.0251	1.4967	-778.3300
PV Unit electricity exported	-715.6625	0.4620	-330.6104
Total			-1108.9404 (283)
Total Primary energy kWh/year			3765.3070 (286)
Target Primary Energy Rate (TPER)			75.3100 (287)

Energy Report

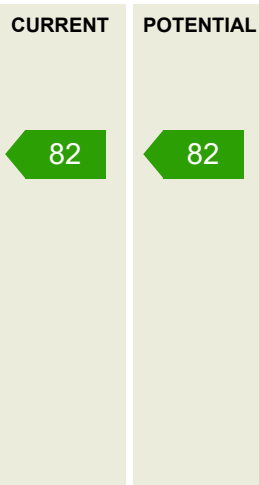
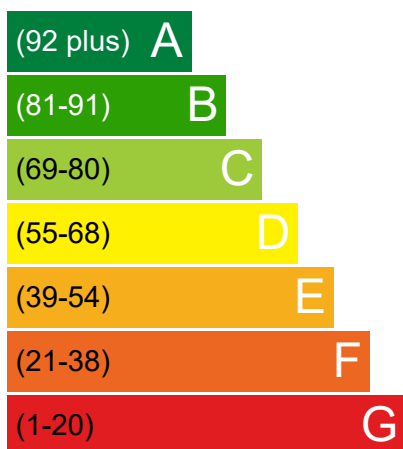
Dwelling Address	
Reference	Block B Flat 2-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	50

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

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

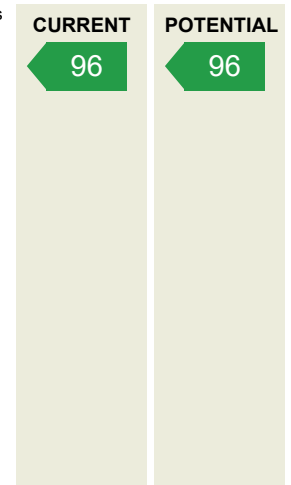
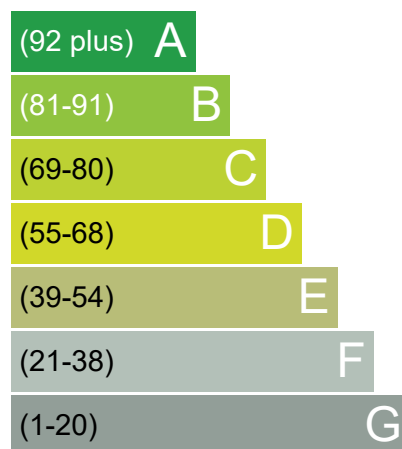
Energy Efficiency Rating

Most energy efficient - lower running costs

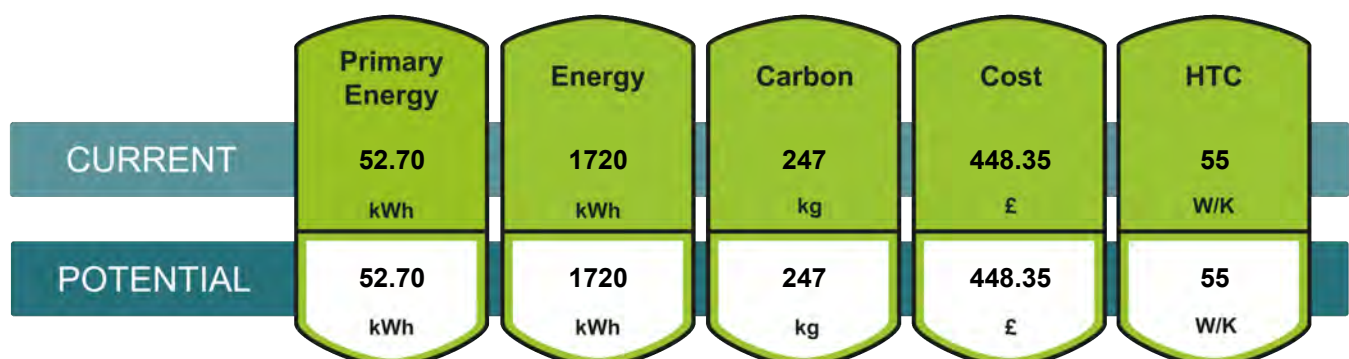


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£34	£34	
Heating		£89	£89	
Hot Water		£326	£326	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£448	£448	

Estimated energy use and potential savings



Space Heating

340

kWh per year



Water Heating

771

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block B Flat 3				Issued on Date	15/04/2025	
Assessment Reference	Be Green			Prop Type Ref			
Property							
SAP Rating	82 B		DER	4.54		TER	11.47
Environmental	96 A		% DER < TER				60.42
CO ₂ Emissions (t/year)	0.3		DFEE	33.17		TFEE	34.37
Compliance Check	See BREL		% DFEE < TFEE				3.50
% DPER < TPER	19.51		DPER	48.20		TPER	59.88
Assessor Details	Mr. Joe Mountain					Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		
Dwelling volume			

2. Ventilation rate

Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
Number of blocked chimneys	0 * 20 =	0.0000 (6f)
Number of intermittent extract fans	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)

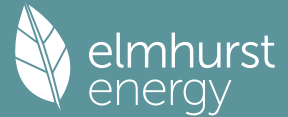
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1700 (21)

	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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	72.8000	13.1000	59.7000	0.1800	10.7460	190.0000	11342.9995 (29a)
External Roof 1	70.0000		70.0000	0.1300	9.1000	9.0000	630.0000 (30)
Total net area of external elements Aum(A, m ²)			142.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	37.2134		(33)
Main dwelling							
Party Floor 1			70.0000			30.0000	2100.0000 (32d)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	14072.9995 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							201.0428 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E7 Party floor between dwellings (in blocks of flats)				28.0000	0.0000	0.0000	
E14 Flat roof				28.0000	0.0000	0.0000	
E16 Corner (normal)				10.4000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	37.2134 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 31.4408	Feb 31.3860	Mar 31.3323	Apr 31.0801	May 31.0329	Jun 30.8132	Jul 30.8132	Aug 30.7726	Sep 30.8979	Oct 31.0329	Nov 31.1284	Dec 31.2282	(38)
Heat transfer coeff	68.6542	68.5995	68.5458	68.2935	68.2464	68.0267	68.0267	67.9860	68.1113	68.2464	68.3418	68.4416	(39)
Average = Sum(39)m / 12 =												68.2933	
HLP	Jan 0.9808	Feb 0.9800	Mar 0.9792	Apr 0.9756	May 0.9749	Jun 0.9718	Jul 0.9718	Aug 0.9712	Sep 0.9730	Oct 0.9749	Nov 0.9763	Dec 0.9777	(40)
HLP (average)												0.9756	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461	(42)
Hot water usage for mixer showers														
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths														
26.1376	25.7430	25.1817	24.3411	23.5836	22.5407	21.7495	22.7170	23.2247	24.2581	25.3324	26.1169			(42b)
Hot water usage for other uses														
37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326			(42c)
Average daily hot water use (litres/day)													58.4472	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
63.7702	62.0071	60.0774	57.8683	55.7423	53.3310	52.5398	54.8757	56.7519	59.1537	61.5965	63.7494			(44)
Energy content (annual)	93.8807	82.0480	85.8493	75.5905	71.8296	61.6755	58.0580	64.5897	65.8294	76.2256	83.2498	93.6207		(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		912.4468		
14.0821	12.3072	12.8774	11.3386	10.7744	9.2513	8.7087	9.6885	9.8744	11.4338	12.4875	14.0431			(46)
Water storage loss:														
Store volume													150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8600	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													1.0044	(55)
Total storage loss														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364			(56)
If cylinder contains dedicated solar storage														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364			(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	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			(61)
Total heat required for water heating calculated for each month														
148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195			(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			(63d)
Output from w/h	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195		(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		1552.9488		(64)
Electric shower(s)	49.5554	44.1543	48.2148	46.0108	46.8741	44.7134	46.2038	46.8741	46.0108	48.2148	47.3081	49.5554		(64a)
												563.6896		(64a)
Heat gains from water heating, kWh/month														
87.1232	77.6270	84.1176	78.7517	79.1209	73.8006	74.3743	76.7137	75.5062	80.9177	81.6228	87.0368			(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(66)
112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	188.5918	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(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)													
-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Water heating gains (Table 5)													
117.1011	115.5164	113.0613	109.3774	106.3453	102.5009	99.9654	103.1098	104.8697	108.7604	113.3650	116.9849	116.9849	(72)
Total internal gains	472.1333	483.4221	464.9817	453.6826	433.4179	419.9110	405.3021	406.3991	416.6863	428.1923	450.0294	463.3119	(73)

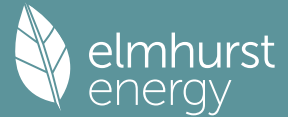
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		Gains W	
Northeast				6.2000	11.2829	0.3500	0.0000		0.7700		18.8527 (75)	
Southeast				2.1000	36.7938	0.3500	0.0000		0.7700		20.8235 (77)	
Northwest				4.8000	11.2829	0.3500	0.0000		0.7700		14.5956 (81)	
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	526.4051	586.9771	636.1808	715.2708	771.5672	775.4744	739.8386	680.7815	618.7081	550.5994	517.0577	508.4480 (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	56.9399	56.9854	57.0300	57.2406	57.2802	57.4652	57.4652	57.4996	57.3938	57.2802	57.2002	57.1168
alpha	4.7960	4.7990	4.8020	4.8160	4.8187	4.8310	4.8310	4.8333	4.8263	4.8187	4.8133	4.8078
util living area												
	0.9869	0.9769	0.9543	0.8819	0.7387	0.5457	0.4015	0.4535	0.6989	0.9145	0.9749	0.9889 (86)

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Living	19.8209	20.0012	20.2724	20.6319	20.8782	20.9771	20.9957	20.9925	20.9293	20.6117	20.1607	19.7825
Non living	18.7315	18.9594	19.2986	19.7322	20.0006	20.0928	20.1052	20.1042	20.0559	19.7189	19.1653	18.6846
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	20.3968	20.0012	20.2724	20.6319	20.8782	20.9771	20.9957	20.9925	20.9293	20.6117	20.1607	19.9528 (87)
Th 2	20.0994	20.1000	20.1007	20.1037	20.1043	20.1069	20.1069	20.1074	20.1059	20.1043	20.1031	20.1019 (88)
util rest of house	0.9837	0.9712	0.9431	0.8547	0.6878	0.4755	0.3215	0.3683	0.6278	0.8883	0.9678	0.9861 (89)
MIT 2	19.5541	18.9594	19.2986	19.7322	20.0006	20.0928	20.1052	20.1042	20.0559	19.7189	19.1653	18.9400 (90)
Living area fraction									FLA = Living area / (4) =			0.3857 (91)
MIT	19.8791	19.3612	19.6742	20.0792	20.3391	20.4339	20.4487	20.4468	20.3928	20.0632	19.5492	19.3306 (92)
Temperature adjustment												0.0000
adjusted MIT	19.8791	19.3612	19.6742	20.0792	20.3391	20.4339	20.4487	20.4468	20.3928	20.0632	19.5492	19.3306 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9828	0.9654	0.9367	0.8539	0.7018	0.5017	0.3524	0.4011	0.6517	0.8870	0.9622	0.9831 (94)
Useful gains	517.3354	566.6953	595.9422	610.7693	541.4923	389.0847	260.6938	273.0625	403.2254	488.3606	497.5258	499.8433 (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	1069.5740	992.0335	903.0372	763.4689	589.5868	396.8578	261.8154	275.1285	428.6100	645.8319	850.8038	1035.5662 (97)
Space heating kWh	410.8655	285.8273	228.4787	109.9438	35.7824	0.0000	0.0000	0.0000	0.0000	117.1586	254.3602	398.5778 (98a)
Space heating requirement - total per year (kWh/year)												1840.9942
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	410.8655	285.8273	228.4787	109.9438	35.7824	0.0000	0.0000	0.0000	0.0000	117.1586	254.3602	398.5778 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1840.9942
Space heating per m2										(98c) / (4) =		26.2999 (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 %)												306.0519 (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	410.8655	285.8273	228.4787	109.9438	35.7824	0.0000	0.0000	0.0000	0.0000	117.1586	254.3602	398.5778 (98)
Space heating efficiency (main heating system 1)	306.0519	306.0519	306.0519	306.0519	306.0519	0.0000	0.0000	0.0000	0.0000	306.0519	306.0519	306.0519 (210)
Space heating fuel (main heating system)	134.2470	93.3918	74.6536	35.9232	11.6916	0.0000	0.0000	0.0000	0.0000	38.2806	83.1102	130.2321 (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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195 (64)
Efficiency of water heater (217)m	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275	185.0275 (216)
Fuel for water heating, kWh/month	80.1392	70.8989	75.7985	69.3056	68.2214	61.7851	60.7784	64.3086	64.0302	70.5973	73.4452	79.9987 (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	23.9244	19.1931	17.2812	12.6610	9.7797	7.9901	8.9214	11.5963	15.0625	19.7628	22.3220	24.5894 (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												601.5302 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												185.0275
Water heating fuel used												839.3070 (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)												193.0839 (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												2197.6107 (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	601.5302	0.1561	93.9109 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	839.3070	0.1404	117.8257 (264)
Energy for instantaneous electric shower(s)	563.6896	0.1391	78.4217 (264a)
Space and water heating			211.7366 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	193.0839	0.1443	27.8680 (268)
Total CO2, kg/year			318.0263 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5400 (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	601.5302	1.5780	949.1937 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	839.3070	1.5191	1274.9612 (278)
Energy for instantaneous electric shower(s)	563.6896	1.5143	853.6145 (278a)
Space and water heating			2224.1548 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	193.0839	1.5338	296.1585 (282)
Total Primary energy kWh/year			3373.9278 (286)
Dwelling Primary energy Rate (DPER)			48.2000 (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	70.0000 (1b)	x 2.6000 (2b)	= 182.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	182.0000 (5)

2. Ventilation rate

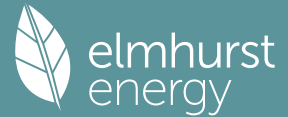
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1099 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3599 (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) = 0.3059 (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	0.3900	0.3824	0.3747	0.3365	0.3288	0.2906	0.2906	0.2830	0.3059	0.3288	0.3441	0.3594 (22b)
Effective ac	0.5761	0.5731	0.5702	0.5566	0.5541	0.5422	0.5422	0.5400	0.5468	0.5541	0.5592	0.5646 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	72.8000	13.1000	59.7000	0.1800	10.7460		(29a)
External Roof 1	70.0000		70.0000	0.1100	7.7000		(30)
Total net area of external elements Aum(A, m2)			142.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		33.4460		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							201.0428 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value		Total

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E7 Party floor between dwellings (in blocks of flats)	28.0000	0.0700	1.9600										
E14 Flat roof	28.0000	0.0800	2.2400										
E16 Corner (normal)	10.4000	0.0900	0.9360										
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				5.1360 (36)									
Point Thermal bridges			(36a) =	0.0000									
Total fabric heat loss			(33) + (36) + (36a) =	38.5820 (37)									
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	34.5983	34.4209	34.2470	33.4303	33.2775	32.5662	32.5662	32.4345	32.8402	33.2775	33.5866	33.9098	(38)
Average = Sum(39)m / 12 =	73.1803	73.0029	72.8290	72.0123	71.8595	71.1482	71.1482	71.0165	71.4222	71.8595	72.1686	72.4918	(39)
												72.0116	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0454	1.0429	1.0404	1.0287	1.0266	1.0164	1.0164	1.0145	1.0203	1.0266	1.0310	1.0356	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	
												1.0287	
												31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461 (42)
Hot water usage for mixer showers													
Hot water usage for baths	61.8798	60.9498	59.5947	57.0020	55.0887	52.9549	51.7420	53.0869	54.5611	56.8521	59.5005	61.6427	(42a)
Hot water usage for other uses	26.7336	26.3365	25.7774	24.7465	23.9746	23.1187	22.6564	23.2116	23.8161	24.7319	25.7840	26.6432	(42b)
Average daily hot water use (litres/day)	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326	(42c)
												116.0487	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	126.2459	123.5505	120.2678	115.2758	111.2220	106.8639	105.1887	108.4572	111.9043	116.4797	121.5487	125.9184	(44)
Energy content (annual)	199.9426	175.9342	184.8472	157.8067	149.7262	131.4016	127.2166	134.2926	137.9892	158.0618	173.1684	197.1578	(45)
Distribution loss (46)m = 0.15 x (45)m													
Water storage loss:	29.9914	26.3901	27.7271	23.6710	22.4589	19.7102	19.0825	20.1439	20.6984	23.7093	25.9753	29.5737	(46)
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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	246.5375	218.0199	231.4421	202.8986	196.3211	176.4934	173.8115	180.8875	183.0811	204.6567	218.2602	243.7527	(62)
WWHRS	-28.2888	-25.0189	-26.1983	-21.6933	-20.2173	-17.3001	-16.2161	-17.2442	-17.8994	-21.1014	-23.9053	-27.7650	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878	(64)
12Total per year (kWh/year)												2213.3143	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month	103.7568	92.1667	98.7376	88.5442	87.0599	79.7645	79.5754	81.9282	81.9549	89.8315	93.6520	102.8309	(65)

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

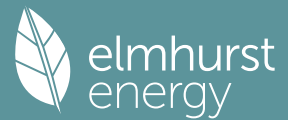
Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	(68)
Pumps, fans	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Water heating gains (Table 5)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Total internal gains	139.4581	137.1528	132.7118	122.9781	117.0160	110.7840	106.9562	110.1186	113.8262	120.7412	130.0722	138.2136	(72)
	497.4904	508.0585	487.6322	470.2832	447.0886	428.1941	412.2929	413.4079	425.6429	443.1731	469.7366	487.5406	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W				
Northeast				6.2000	11.2829	0.6300	0.7000	0.7700	21.3789 (75)				
Southeast				2.1000	36.7938	0.6300	0.7000	0.7700	23.6138 (77)				
Northwest				4.8000	11.2829	0.6300	0.7000	0.7700	16.5514 (81)				
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843	(83)
Total gains	559.0345	625.4899	681.7720	766.9243	830.5499	831.4030	791.6573	724.5575	654.7355	581.9828	545.7467	538.7249	(84)

7. Mean internal temperature (heating season)

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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	53.4183	53.5481	53.6760	54.2847	54.4001	54.9440	54.9440	55.0459	54.7332	54.4001	54.1671	53.9256
alpha	4.5612	4.5699	4.5784	4.6190	4.6267	4.6629	4.6629	4.6697	4.6489	4.6267	4.6111	4.5950
util living area	0.9845	0.9730	0.9476	0.8702	0.7232	0.5322	0.3923	0.4448	0.6905	0.9079	0.9715	0.9867 (86)
MIT	19.7548	19.9489	20.2393	20.6205	20.8740	20.9760	20.9953	20.9918	20.9241	20.5924	20.1205	19.7251 (87)
Th 2	20.0456	20.0477	20.0498	20.0594	20.0613	20.0697	20.0697	20.0713	20.0664	20.0613	20.0576	20.0538 (88)
util rest of house	0.9806	0.9665	0.9349	0.8407	0.6701	0.4607	0.3109	0.3579	0.6170	0.8797	0.9635	0.9834 (89)
MIT 2	18.6088	18.8546	19.2177	19.6801	19.9554	20.0551	20.0679	20.0679	20.0134	19.6602	19.0809	18.5771 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.0509	19.2767	19.6117	20.0429	20.3097	20.4103	20.4256	20.4242	20.3647	20.0198	19.4819	19.0199 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.0509	19.2767	19.6117	20.0429	20.3097	20.4103	20.4256	20.4242	20.3647	20.0198	19.4819	19.0199 (93)

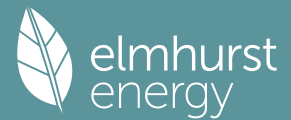
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9754	0.9598	0.9278	0.8401	0.6848	0.4874	0.3423	0.3913	0.6417	0.8783	0.9572	0.9786 (94)
Useful gains	545.2798	600.3453	632.5593	644.2990	568.7627	405.2431	270.9532	283.5289	420.1226	511.1420	522.4132	527.2206 (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	1079.4721	1049.5410	954.9121	802.4224	618.6899	413.3933	272.1859	285.7869	447.4377	676.9003	893.5836	1074.3206 (97)
Space heating kWh	397.4391	301.8595	239.8304	113.8489	37.1459	0.0000	0.0000	0.0000	0.0000	123.3242	267.2427	407.0424 (98a)
Space heating requirement - total per year (kWh/year)												1887.7331
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	397.4391	301.8595	239.8304	113.8489	37.1459	0.0000	0.0000	0.0000	0.0000	123.3242	267.2427	407.0424 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1887.7331
Space heating per m2												(98c) / (4) = 26.9676 (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	397.4391	301.8595	239.8304	113.8489	37.1459	0.0000	0.0000	0.0000	0.0000	123.3242	267.2427	407.0424 (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)	430.5949	327.0417	259.8380	123.3466	40.2447	0.0000	0.0000	0.0000	0.0000	133.6123	289.5371	440.9993 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878 (64)
Efficiency of water heater (217)m	85.3863	85.0586	84.4099	83.0478	81.2341	79.8000	79.8000	79.8000	79.8000	83.1882	84.7744	79.8000 (216)
Fuel for water heating, kWh/month	255.6014	226.9036	243.1511	218.1941	216.7854	199.4903	197.4880	205.0668	206.9946	220.6506	229.2614	252.7393 (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	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	20.9948	16.8428	15.1651	11.1106	8.5821	7.0117	7.8289	10.1763	13.2180	17.3428	19.5886	21.5783 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-32.8701	-46.4063	-66.8089	-75.2540	-81.2811	-75.9327	-75.0050	-70.7452	-63.2427	-53.1331	-36.1640	-28.4114 (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)	-18.3768	-38.6803	-76.9148	-115.5671	-152.8459	-153.5740	-151.7560	-128.4671	-94.1378	-55.3206	-24.5385	-14.5294 (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												2045.2146 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2672.3269 (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)												169.4401 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1729.9627 (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												

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Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3243.0189 (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	2045.2146	0.2100	429.4951 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2672.3269	0.2100	561.1886 (264)
Space and water heating			990.6837 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	169.4401	0.1443	24.4554 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	0.1345	-94.8895
PV Unit electricity exported	-1024.7084	0.1259	-128.9966
Total			-223.8861 (269)
Total CO2, kg/year			803.1823 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.4700 (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	2045.2146	1.1300	2311.0925 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2672.3269	1.1300	3019.7294 (278)
Space and water heating			5330.8219 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	169.4401	1.5338	259.8929 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	1.4973	-1055.9481
PV Unit electricity exported	-1024.7084	0.4621	-473.5061
Total			-1529.4542 (283)
Total Primary energy kWh/year			4191.3613 (286)
Target Primary Energy Rate (TPER)			59.8800 (287)

Energy Report



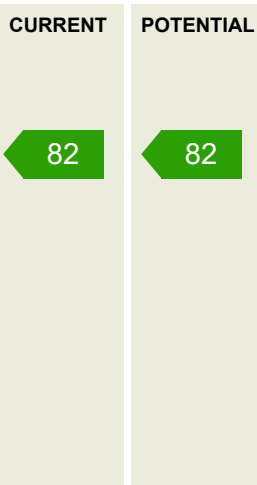
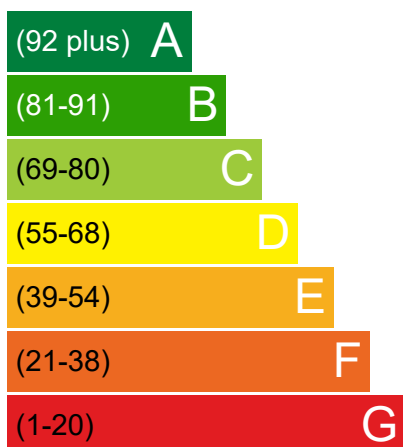
Dwelling Address	
Reference	Block B Flat 3-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

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

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

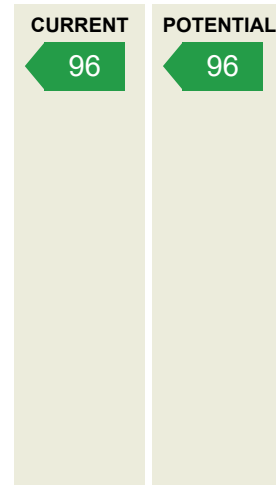
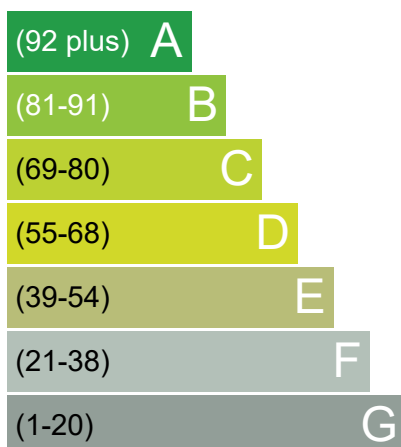
Energy Efficiency Rating

Most energy efficient - lower running costs

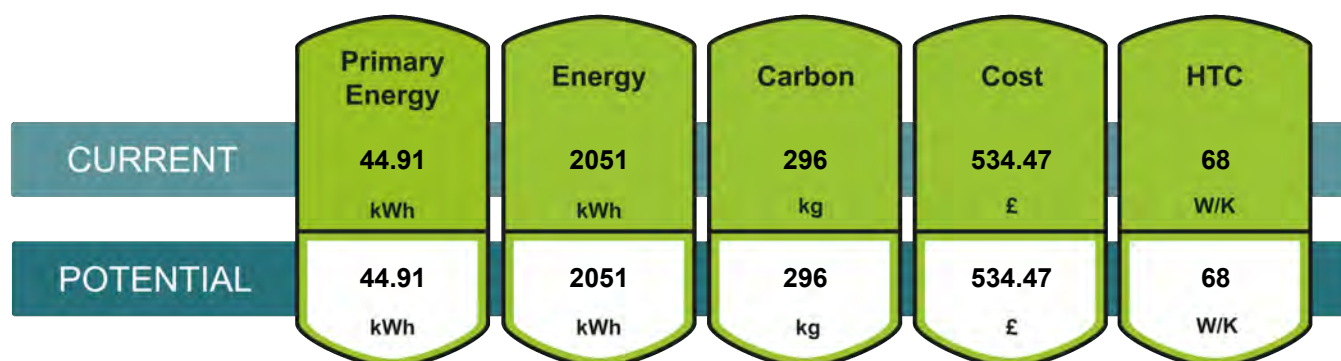


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£50	£50	
Heating		£119	£119	
Hot Water		£366	£366	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£534	£534	

Estimated energy use and potential savings



Space Heating

455
kWh per year



Water Heating

839
kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

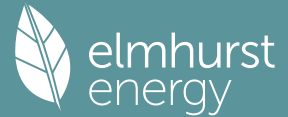
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Full SAP Calculation Printout



Property Reference	Block B Flat 4				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	82 B	DER	5.35	TER	14.10	
Environmental	96 A	% DER < TER				62.06
CO ₂ Emissions (t/year)	0.25	DFEE	37.98	TFEE	38.98	
Compliance Check	See BREL	% DFEE < TFEE				2.56
% DPER < TPER	23.32	DPER	56.83	TPER	74.11	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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	50.0000 (1b)	2.6000 (2b)	130.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		130.0000 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 130.0000 (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)

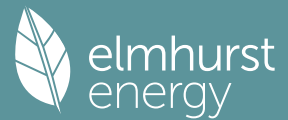
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	4.0000	(17)
Infiltration rate	0.2000	(18)
Number of sides sheltered	2	(19)
Shelter factor	(20) = 1 - [0.075 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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	62.4000	13.1000	49.3000	0.1800	8.8740	190.0000	9366.9996 (29a)
External Roof 1	50.0000		50.0000	0.1300	6.5000	9.0000	450.0000 (30)
Total net area of external elements Aum(A, m ²)			112.4000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.7414		(33)
Main dwelling							
Party Floor 1			50.0000			30.0000	1500.0000 (32d)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	11316.9996 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							226.3400 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E7 Party floor between dwellings (in blocks of flats)				24.0000	0.0000	0.0000	
E14 Flat roof				24.0000	0.0000	0.0000	
E16 Corner (normal)				10.4000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	32.7414 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 22.4577	Feb 22.4186	Mar 22.3802	Apr 22.2001	May 22.1664	Jun 22.0095	Jul 22.0095	Aug 21.9804	Sep 22.0699	Oct 22.1664	Nov 22.2346	Dec 22.3059	(38)
Heat transfer coeff	55.1992	55.1600	55.1217	54.9415	54.9078	54.7509	54.7509	54.7218	54.8113	54.9078	54.9760	55.0473	(39)
Average = Sum(39)m / 12 =												54.9413	
HLP	Jan 1.1040	Feb 1.1032	Mar 1.1024	Apr 1.0988	May 1.0982	Jun 1.0950	Jul 1.0950	Aug 1.0944	Sep 1.0962	Oct 1.0982	Nov 1.0995	Dec 1.1009	(40)
HLP (average)												1.0988	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.6901	(42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	22.2178	21.8825	21.4053	20.6908	20.0468	19.1604	18.4878	19.3102	19.7418	20.6202	21.5334	22.2002	22.2002	(42b)
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383	31.9383	(42c)
Average daily hot water use (litres/day)													49.6360	(43)
Daily hot water use	Jan 54.1562	Feb 52.6594	Mar 51.0209	Apr 49.1449	May 47.3396	Jun 45.2917	Jul 44.6192	Aug 46.6030	Sep 48.1960	Oct 50.2357	Nov 52.3103	Dec 54.1385	54.1385	(44)
Energy conte	79.7272	69.6790	72.9078	64.1956	61.0018	52.3784	49.3055	54.8525	55.9049	64.7338	70.6992	79.5064	79.5064	(45)
Energy content (annual)													774.8921	
Distribution loss (46)m = 0.15 x (45)m	11.9591	10.4519	10.9362	9.6293	9.1503	7.8568	7.3958	8.2279	8.3857	9.7101	10.6049	11.9260	11.9260	(46)
Water storage loss:													150.0000	(47)
Store volume													1.8600	(48)
a) If manufacturer declared loss factor is known (kWh/day):													0.5400	(49)
Temperature factor from Table 2b													1.0044	(55)
Enter (49) or (54) in (55)														
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	(56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	(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	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	0.0000	(61)
Total heat required for water heating calculated for each month	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052	133.9052	(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	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	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	0.0000	(63d)
Output from w/h	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052	133.9052	(64)
12Total per year (kWh/year)													1415.3941	(64)
Electric shower(s)	42.0893	37.5019	40.9507	39.0787	39.8120	37.9768	39.2427	39.8120	39.0787	40.9507	40.1807	42.0893	42.0893	(64a)
Heat gains from water heating, kWh/month	80.5507	71.8513	77.9985	73.2299	73.7552	69.0252	69.7238	71.7105	70.4733	75.2807	75.6678	80.4773	80.4773	(65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													478.7637	(64a)

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

Metabolic gains (Table 5), Watts														
(66)m	Jan 84.5050	Feb 84.5050	Mar 84.5050	Apr 84.5050	May 84.5050	Jun 84.5050	Jul 84.5050	Aug 84.5050	Sep 84.5050	Oct 84.5050	Nov 84.5050	Dec 84.5050	84.5050	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	74.2626	82.2193	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376	140.7376	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	(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	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	(71)
Water heating gains (Table 5)	108.2670	106.9215	104.8367	101.7082	99.1333	95.8683	93.7148	96.3851	97.8795	101.1837	105.0942	108.1684	108.1684	(72)
Total internal gains	378.1151	386.2542	372.3626	363.5131	348.1163	337.6026	326.4773	327.6198	335.4397	344.4648	361.1972	371.5201	371.5201	(73)

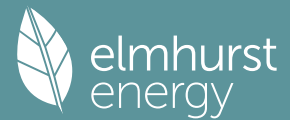
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	432.3869	489.8092	543.5617	625.1013	686.2656	693.1660	661.0138	602.0021	537.4614	466.8720	428.2255	416.6562	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)														
tau	Jan 56.9503	Feb 56.9907	Mar 57.0304	Apr 57.2174	May 57.2525	Jun 57.4166	Jul 57.4166	Aug 57.4471	Sep 57.3533	Oct 57.2525	Nov 57.1815	Dec 57.1075	57.1075	
alpha	4.7967	4.7994	4.8020	4.8145	4.8168	4.8278	4.8278	4.8298	4.8236	4.8168	4.8121	4.8072	4.8072	
util living area	0.9858	0.9734	0.9438	0.8525	0.6882	0.4961	0.3627	0.4145	0.6597	0.8998	0.9719	0.9880	0.9880	(86)

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Living	19.8411	20.0380	20.3303	20.6912	20.9103	20.9846	20.9972	20.9949	20.9447	20.6466	20.1856	19.7993
Non living	18.6714	18.9191	19.2808	19.7050	19.9317	19.9965	20.0040	20.0036	19.9686	19.6673	19.1097	18.6204
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	20.4071	20.0380	20.3303	20.6912	20.9103	20.9846	20.9972	20.9949	20.9447	20.6466	20.1856	19.9672 (87)
Th 2	19.9976	19.9982	19.9988	20.0018	20.0023	20.0049	20.0049	20.0054	20.0039	20.0023	20.0012	20.0001 (88)
util rest of house												
	0.9818	0.9662	0.9288	0.8177	0.6300	0.4229	0.2816	0.3267	0.5802	0.8669	0.9631	0.9846 (89)
MIT 2	19.4689	18.9191	19.2808	19.7050	19.9317	19.9965	20.0040	20.0036	19.9686	19.6673	19.1097	18.8690 (90)
Living area fraction									FLA = Living area / (4) =			0.5000 (91)
MIT	19.9380	19.4785	19.8056	20.1981	20.4210	20.4906	20.5006	20.4992	20.4566	20.1570	19.6476	19.4181 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9380	19.4785	19.8056	20.1981	20.4210	20.4906	20.5006	20.4992	20.4566	20.1570	19.6476	19.4181 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9816	0.9616	0.9255	0.8251	0.6553	0.4590	0.3221	0.3706	0.6176	0.8727	0.9592	0.9822	(94)
Useful gains	424.4095	471.0184	503.0535	515.7718	449.6857	318.1730	212.9439	223.1170	331.9508	407.4172	410.7580	409.2344	(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													
	863.2041	804.1531	733.4267	620.7349	478.8497	322.5133	213.5629	224.3167	348.4153	524.7511	689.8189	837.7169	(97)
Space heating kWh													
	326.4632	223.8665	171.3976	75.5735	21.6980	0.0000	0.0000	0.0000	0.0000	87.2964	200.9239	318.7910	(98a)
Space heating requirement - total per year (kWh/year)												1426.0100	
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													
	326.4632	223.8665	171.3976	75.5735	21.6980	0.0000	0.0000	0.0000	0.0000	87.2964	200.9239	318.7910	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1426.0100	
Space heating per m2												28.5202	(99)
										(98c) / (4) =			

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 %)													302.0502 (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													
	326.4632	223.8665	171.3976	75.5735	21.6980	0.0000	0.0000	0.0000	0.0000	87.2964	200.9239	318.7910	(98)
Space heating efficiency (main heating system 1)													
	302.0502	302.0502	302.0502	302.0502	302.0502	0.0000	0.0000	0.0000	0.0000	302.0502	302.0502	302.0502	(210)
Space heating fuel (main heating system)													
	108.0824	74.1157	56.7447	25.0202	7.1836	0.0000	0.0000	0.0000	0.0000	28.9013	66.5200	105.5424	(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													
	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052	(64)
Efficiency of water heater													
(217)m	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	183.6465	(216)
Fuel for water heating, kWh/month													
	73.0349	64.6968	69.3215	63.6220	62.8385	57.1872	56.4695	59.4900	59.1075	64.8706	67.1634	72.9147	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting													
	16.1887	12.9871	11.6935	8.5671	6.6175	5.4066	6.0367	7.8468	10.1922	13.3727	15.1044	16.6386	(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													472.1103 (211)
Space heating fuel - main system 2													0.0000 (213)
Space heating fuel - secondary													0.0000 (215)
Efficiency of water heater													183.6465
Water heating fuel used													770.7167 (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)													130.6518 (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													1852.2425 (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	472.1103	0.1565	73.8625 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	770.7167	0.1403	108.1088 (264)
Energy for instantaneous electric shower(s)	478.7637	0.1391	66.6066 (264a)
Space and water heating			181.9713 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	130.6518	0.1443	18.8571 (268)
Total CO ₂ , kg/year			267.4350 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.3500 (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	472.1103	1.5792	745.5486 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	770.7167	1.5186	1170.4387 (278)
Energy for instantaneous electric shower(s)	478.7637	1.5143	725.0083 (278a)
Space and water heating			1915.9874 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	130.6518	1.5338	200.3981 (282)
Total Primary energy kWh/year			2841.3937 (286)
Dwelling Primary energy Rate (DPER)			56.8300 (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	50.0000 (1b)	x 2.6000 (2b)	= 130.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	130.0000 (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) = 0.1538 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4038 (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) = 0.3433 (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	0.4377	0.4291	0.4205	0.3776	0.3690	0.3261	0.3261	0.3175	0.3433	0.3690	0.3862	0.4033 (22b)
Effective ac	0.5958	0.5921	0.5884	0.5713	0.5681	0.5532	0.5532	0.5504	0.5589	0.5681	0.5746	0.5813 (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							
TER Opening Type			12.5000	1.1450	14.3130		(27)
External Wall 1	62.4000	12.5000	49.9000	0.1800	8.9820		(29a)
External Roof 1	50.0000		50.0000	0.1100	5.5000		(30)
Total net area of external elements A _{um} (A, m ²)			112.4000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.7950		(33)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							226.3400 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

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E7 Party floor between dwellings (in blocks of flats)	24.0000	0.0700	1.6800
E14 Flat roof	24.0000	0.0800	1.9200
E16 Corner (normal)	10.4000	0.0900	0.9360
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.5360 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	33.3310 (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	25.5588	25.3993	25.2429	24.5083	24.3709	23.7311	23.7311	23.6126	23.9775	24.3709	24.6489	24.9396
Heat transfer coeff	58.8898	58.7302	58.5739	57.8393	57.7019	57.0621	57.0621	56.9436	57.3085	57.7019	57.9799	58.2706
Average = Sum(39)m / 12 =												57.8386
HLP	1.1778	1.1746	1.1715	1.1568	1.1540	1.1412	1.1412	1.1389	1.1462	1.1540	1.1596	1.1654
HLP (average)												1.1568
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.6901 (42)
Hot water usage for mixer showers													
	52.5569	51.7671	50.6162	48.4141	46.7890	44.9767	43.9465	45.0888	46.3409	48.2867	50.5361	52.3556	(42a)
Hot water usage for baths													
	22.7244	22.3869	21.9117	21.0354	20.3792	19.6517	19.2587	19.7306	20.2445	21.0230	21.9173	22.6476	(42b)
Hot water usage for other uses													
	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383	(42c)
Average daily hot water use (litres/day)													98.5597 (43)
Daily hot water use													
	107.2197	104.9310	102.1434	97.9036	94.4609	90.7597	89.3366	92.1121	95.0395	98.9252	103.2304	106.9415	(44)
Energy conte	169.8097	149.4203	156.9906	134.0251	127.1626	111.5996	108.0448	114.0541	117.1932	134.2406	147.0706	167.4445	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m													1637.0557
	25.4715	22.4130	23.5486	20.1038	19.0744	16.7399	16.2067	17.1081	17.5790	20.1361	22.0606	25.1167	(46)
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss													
	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage													
	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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													
	216.4047	191.5060	203.5855	179.1170	173.7575	156.6915	154.6398	160.6490	162.2850	180.8355	192.1624	214.0394	(62)
WWHRS	-24.0268	-21.2495	-22.2513	-18.4249	-17.1714	-14.6937	-13.7730	-14.6462	-15.2026	-17.9222	-20.3037	-23.5819	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h													
	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575	(64)
12Total per year (kWh/year)													1962.4258 (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													
	93.7377	83.3508	89.4753	80.6368	79.5575	73.1803	73.2008	75.1989	75.0402	81.9109	84.9744	92.9512	(65)

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

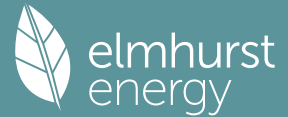
Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	74.2626	82.2193	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	76.7380	74.2626	76.7380	74.2626	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	(71)
Water heating gains (Table 5)													
	125.9915	124.0340	120.2625	111.9956	106.9321	101.6394	98.3882	101.0738	104.2225	110.0953	118.0201	124.9344	(72)
Total internal gains													
	398.8396	406.3666	390.7883	376.8005	358.9151	343.3736	331.1507	332.3085	341.7827	356.3764	377.1230	391.2862	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W			
Northeast					5.9200	11.2829	0.6300	0.7000	0.7700	20.4134 (75)			
Southeast					2.0000	36.7938	0.6300	0.7000	0.7700	22.4893 (77)			
Northwest					4.5800	11.2829	0.6300	0.7000	0.7700	15.7928 (81)			
Solar gains	58.6956	112.0065	185.1961	283.0098	365.8660	384.7171	361.9623	296.8614	218.5503	132.4040	72.4939	48.8140	(83)
Total gains	457.5351	518.3731	575.9844	659.8103	724.7811	728.0907	693.1130	629.1699	560.3330	488.7804	449.6169	440.1002	(84)

7. Mean internal temperature (heating season)

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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	53.3812	53.5263	53.6692	54.3508	54.4802	55.0911	55.0911	55.2057	54.8542	54.4802	54.2190	53.9485
alpha	4.5587	4.5684	4.5779	4.6234	4.6320	4.6727	4.6727	4.6804	4.6569	4.6320	4.6146	4.5966
util living area	0.9834	0.9699	0.9386	0.8455	0.6819	0.4914	0.3602	0.4123	0.6581	0.8953	0.9689	0.9859 (86)
MIT	19.7704	19.9789	20.2876	20.6714	20.9018	20.9828	20.9968	20.9941	20.9382	20.6238	20.1436	19.7408 (87)
Th 2	19.9378	19.9404	19.9429	19.9547	19.9569	19.9673	19.9673	19.9692	19.9633	19.9569	19.9525	19.9478 (88)
util rest of house	0.9788	0.9618	0.9222	0.8090	0.6217	0.4164	0.2767	0.3219	0.5762	0.8608	0.9591	0.9819 (89)
MIT 2	18.5388	18.8019	19.1842	19.6411	19.8802	19.9580	19.9663	19.9671	19.9241	19.6028	19.0206	18.5085 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.1546	19.3904	19.7359	20.1563	20.3910	20.4704	20.4815	20.4806	20.4311	20.1133	19.5821	19.1246 (92)
Temperature adjustment												
adjusted MIT	19.1546	19.3904	19.7359	20.1563	20.3910	20.4704	20.4815	20.4806	20.4311	20.1133	19.5821	19.1246 (93)

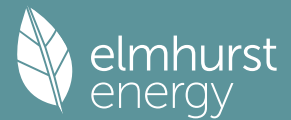
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9745	0.9567	0.9185	0.8166	0.6476	0.4534	0.3185	0.3671	0.6145	0.8666	0.9548	0.9779 (94)
Useful gains	445.8473	495.9089	529.0462	538.8247	469.3971	330.1119	220.7564	230.9755	344.3485	423.5807	429.2781	430.3892 (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	874.7850	851.0247	775.2795	651.0548	501.4870	334.9781	221.4870	232.3647	362.8286	548.9348	723.7097	869.6675 (97)
Space heating kWh	319.1297	238.6378	183.1976	80.8057	23.8749	0.0000	0.0000	0.0000	0.0000	93.2634	211.9907	326.8231 (98a)
Space heating requirement - total per year (kWh/year)	1477.7229											
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	319.1297	238.6378	183.1976	80.8057	23.8749	0.0000	0.0000	0.0000	0.0000	93.2634	211.9907	326.8231 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1477.7229											
Space heating per m2	(98c) / (4) = 29.5545 (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	319.1297	238.6378	183.1976	80.8057	23.8749	0.0000	0.0000	0.0000	0.0000	93.2634	211.9907	326.8231 (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)	345.7526	258.5458	198.4806	87.5468	25.8666	0.0000	0.0000	0.0000	0.0000	101.0438	229.6757	354.0878 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
Efficiency of water heater (217)m	85.1866	84.8170	84.0827	82.6012	80.8846	79.8000	79.8000	79.8000	79.8000	82.8573	84.5316	79.8000 (216)
Fuel for water heating, kWh/month	225.8310	200.7340	215.6616	194.5396	193.5921	177.9421	176.5248	182.9609	184.3137	196.6192	203.3071	223.3855 (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	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	15.4303	12.3788	11.1457	8.1658	6.3075	5.1533	5.7539	7.4792	9.7147	12.7462	14.3968	15.8592 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-23.8319	-33.8314	-48.9876	-55.5376	-60.3279	-56.5260	-55.8772	-52.5565	-46.7283	-38.9382	-26.3015	-20.5810 (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	-12.7730	-26.9447	-53.6721	-80.7632	-106.9058	-107.4073	-106.0950	-89.7380	-65.6863	-38.5287	-17.0574	-10.0911 (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	1600.9999 (211)											
Space heating fuel - main system 2	0.0000 (213)											
Space heating fuel - secondary	0.0000 (215)											
Efficiency of water heater	79.8000											
Water heating fuel used	2375.4116 (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)	124.5314 (232)											
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation	-1235.6876 (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												

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Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	2951.2553 (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	1600.9999	0.2100	336.2100 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2375.4116	0.2100	498.8364 (264)
Space and water heating			835.0464 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	124.5314	0.1443	17.9737 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.0251	0.1344	-69.8924
PV Unit electricity exported	-715.6625	0.1259	-90.0679
Total			-159.9603 (269)
Total CO2, kg/year			704.9892 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.1000 (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	1600.9999	1.1300	1809.1298 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2375.4116	1.1300	2684.2151 (278)
Space and water heating			4493.3450 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	124.5314	1.5338	191.0104 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.0251	1.4967	-778.3300
PV Unit electricity exported	-715.6625	0.4620	-330.6104
Total			-1108.9404 (283)
Total Primary energy kWh/year			3705.5158 (286)
Target Primary Energy Rate (TPER)			74.1100 (287)

Energy Report



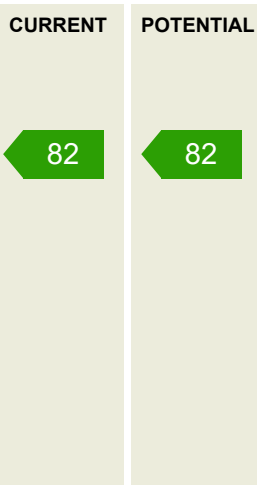
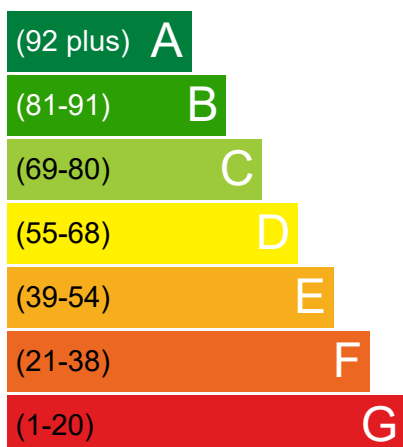
Dwelling Address	
Reference	Block B Flat 4-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	50

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

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

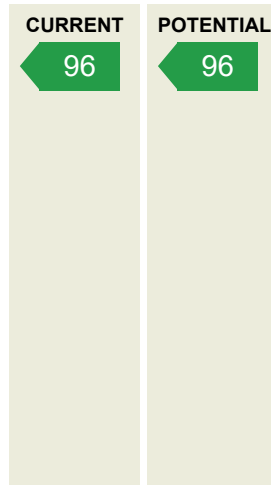
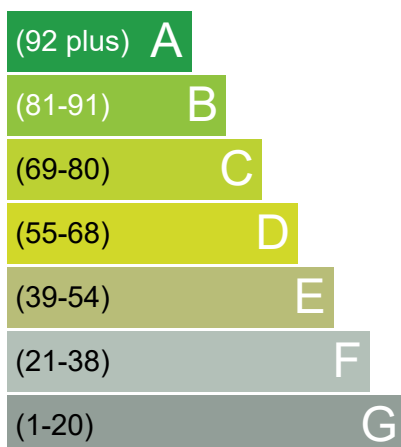
Energy Efficiency Rating

Most energy efficient - lower running costs

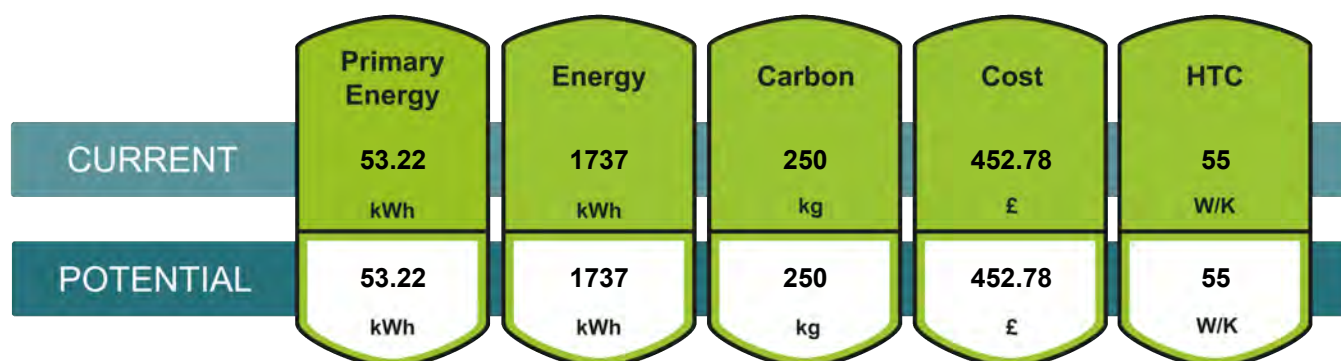


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£34	£34	
Heating		£93	£93	
Hot Water		£326	£326	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£453	£453	

Estimated energy use and potential savings



Space Heating

357
kWh per year



Water Heating

771
kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

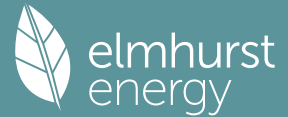
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Full SAP Calculation Printout



Property Reference	Block C Flat 1				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	82 B	DER	5.16	TER	13.14	
Environmental	96 A	% DER < TER				60.73
CO ₂ Emissions (t/year)	0.24	DFEE	33.75	TFEE	34.74	
Compliance Check	See BREL	% DFEE < TFEE				2.85
% DPER < TPER	20.45	DPER	54.87	TPER	68.97	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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	50.0000 (1b)	2.6000 (2b)	130.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		130.0000 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	130.0000 (5)

2. Ventilation rate

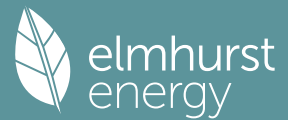
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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												
Opening Type 1			13.1000	1.3258	17.3674			(27)				
Heatloss Floor 1			50.0000	0.1300	6.5000	110.0000	5500.0000	(28a)				
External Wall 1	41.6000	13.1000	28.5000	0.1800	5.1300	190.0000	5414.9997	(29a)				
Total net area of external elements Aum(A, m2)			91.6000					(31)				
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.9974			(33)				
Main dwelling												
Party Ceiling 1			50.0000			20.0000	1000.0000	(32b)				
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		11914.9997	(34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							238.3000	(35)				
List of Thermal Bridges												
K1 Element					Length	Psi-value	Total					
E5 Ground floor (normal)					16.0000	0.0000	0.0000					
E16 Corner (normal)					10.4000	0.0000	0.0000					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000	(36)				
Point Thermal bridges							(36a) =	0.0000				
Total fabric heat loss						(33) + (36) + (36a) =	28.9974	(37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	22.4577	22.4186	22.3802	22.2001	22.1664	22.0095	22.0095	21.9804	22.0699	22.1664	22.2346	22.3059 (38)
Heat transfer coeff	51.4552	51.4160	51.3777	51.1975	51.1638	51.0069	51.0069	50.9778	51.0673	51.1638	51.2320	51.3033 (39)
Average = Sum(39)m / 12 =												51.1973
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0291	1.0283	1.0276	1.0240	1.0233	1.0201	1.0201	1.0196	1.0213	1.0233	1.0246	1.0261 (40)
HLP (average)												1.0239
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.6901 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	22.2178	21.8825	21.4053	20.6908	20.0468	19.1604	18.4878	19.3102	19.7418	20.6202	21.5334	22.2002 (42b)
Hot water usage for other uses	31.9383	30.7769	29.6155	28.4541	27.2927	26.1314	26.1314	27.2927	28.4541	29.6155	30.7769	31.9383 (42c)
Average daily hot water use (litres/day)												49.6360 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	54.1562	52.6594	51.0209	49.1449	47.3396	45.2917	44.6192	46.6030	48.1960	50.2357	52.3103	54.1385 (44)
Energy conte	79.7272	69.6790	72.9078	64.1956	61.0018	52.3784	49.3055	54.8525	55.9049	64.7338	70.6992	79.5064 (45)
Energy content (annual)										Total = Sum(45)m =		774.8921
Distribution loss (46)m = 0.15 x (45)m	11.9591	10.4519	10.9362	9.6293	9.1503	7.8568	7.3958	8.2279	8.3857	9.7101	10.6049	11.9260 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052 (64)
								Total per year (kWh/year) = Sum(64)m =				1415.3941 (64)
12Total per year (kWh/year)												1415 (64)
Electric shower(s)	42.0893	37.5019	40.9507	39.0787	39.8120	37.9768	39.2427	39.8120	39.0787	40.9507	40.1807	42.0893 (64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				478.7637 (64a)
Heat gains from water heating, kWh/month	80.5507	71.8513	77.9985	73.2299	73.7552	69.0252	69.7238	71.7105	70.4733	75.2807	75.6678	80.4773 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050	84.5050 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	74.2626	82.2193	74.2626	76.7380	74.2626	76.7380	74.2626	74.2626	76.7380	74.2626	76.7380	74.2626 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	147.2339	148.7618	144.9117	136.7153	126.3689	116.6447	110.1484	108.6205	112.4706	120.6670	131.0134	140.7376 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505	31.4505 (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)	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040	-67.6040 (71)
Water heating gains (Table 5)	108.2670	106.9215	104.8367	101.7082	99.1333	95.8683	93.7148	96.3851	97.8795	101.1837	105.0942	108.1684 (72)
Total internal gains	378.1151	386.2542	372.3626	363.5131	348.1163	337.6026	326.4773	327.6198	335.4397	344.4648	361.1972	371.5201 (73)

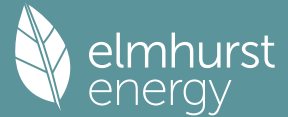
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	432.3869	489.8092	543.5617	625.1013	686.2656	693.1660	661.0138	602.0021	537.4614	466.8720	428.2255	416.6562	(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	64.3225	64.3714	64.4195	64.6462	64.6887	64.8877	64.8877	64.9247	64.8110	64.6887	64.6026	64.5129
alpha	5.2882	5.2914	5.2946	5.3097	5.3126	5.3258	5.3258	5.3283	5.3207	5.3126	5.3068	5.3009
util living area	0.9867	0.9736	0.9409	0.8377	0.6596	0.4664	0.3388	0.3880	0.6299	0.8911	0.9721	0.9889 (86)

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Living	20.0142	20.2004	20.4678	20.7814	20.9472	20.9928	20.9989	20.9978	20.9685	20.7353	20.3253	19.9744
Non living	18.9309	19.1647	19.4938	19.8571	20.0236	20.0628	20.0662	20.0663	20.0462	19.8172	19.3263	18.8826
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	20.4957	20.2004	20.4678	20.7814	20.9472	20.9928	20.9989	20.9978	20.9685	20.7353	20.3253	20.1179 (87)
Th 2	20.0592	20.0598	20.0604	20.0634	20.0640	20.0666	20.0666	20.0671	20.0656	20.0640	20.0629	20.0617 (88)
util rest of house												
	0.9829	0.9664	0.9253	0.8015	0.6035	0.4004	0.2673	0.3101	0.5545	0.8565	0.9631	0.9858 (89)
MIT 2	19.6094	19.1647	19.4938	19.8571	20.0236	20.0628	20.0662	20.0663	20.0462	19.8172	19.3263	19.0951 (90)
Living area fraction												
MIT	20.0171	19.6411	19.9418	20.2823	20.4484	20.4906	20.4953	20.4948	20.4705	20.2395	19.7859	19.5656 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0171	19.6411	19.9418	20.2823	20.4484	20.4906	20.4953	20.4948	20.4705	20.2395	19.7859	19.5656 (93)

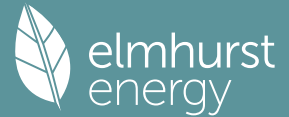
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9827	0.9625	0.9230	0.8106	0.6271	0.4306	0.3002	0.3459	0.5880	0.8637	0.9598	0.9837 (94)
Useful gains	424.9017	471.4331	501.7126	506.6922	430.3669	298.4660	198.4555	208.2618	316.0532	403.2498	411.0275	409.8452 (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	808.7246	757.9293	690.6095	582.7453	447.6039	300.4597	198.6861	208.7452	325.3229	493.1927	649.9222	788.3054 (97)
Space heating kWh	285.5643	192.5255	140.5393	54.7582	12.8244	0.0000	0.0000	0.0000	0.0000	66.9175	172.0042	281.5744 (98a)
Space heating requirement - total per year (kWh/year)												1206.7077
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	285.5643	192.5255	140.5393	54.7582	12.8244	0.0000	0.0000	0.0000	0.0000	66.9175	172.0042	281.5744 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1206.7077
Space heating per m2										(98c) / (4) =		24.1342 (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 %)												299.2828 (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	285.5643	192.5255	140.5393	54.7582	12.8244	0.0000	0.0000	0.0000	0.0000	66.9175	172.0042	281.5744 (98)
Space heating efficiency (main heating system 1)	299.2828	299.2828	299.2828	299.2828	299.2828	0.0000	0.0000	0.0000	0.0000	299.2828	299.2828	299.2828 (210)
Space heating fuel (main heating system)	95.4162	64.3289	46.9587	18.2965	4.2850	0.0000	0.0000	0.0000	0.0000	22.3593	57.4721	94.0830 (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	134.1260	118.8134	127.3066	116.8396	115.4006	105.0224	103.7043	109.2513	108.5489	119.1326	123.3432	133.9052 (64)
Efficiency of water heater (217)m	182.0615	182.0615	182.0615	182.0615	182.0615	182.0615	182.0615	182.0615	182.0615	182.0615	182.0615	182.0615 (216)
Fuel for water heating, kWh/month	73.6707	65.2600	69.9250	64.1759	63.3855	57.6851	56.9611	60.0079	59.6221	65.4354	67.7481	73.5494 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)
Lighting	16.1887	12.9871	11.6935	8.5671	6.6175	5.4066	6.0367	7.8468	10.1922	13.3727	15.1044	16.6386 (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												403.1998 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												182.0615
Water heating fuel used												777.4262 (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)												130.6518 (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												1790.0415 (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	403.1998	0.1569	63.2669 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	777.4262	0.1403	109.0499 (264)
Energy for instantaneous electric shower(s)	478.7637	0.1391	66.6066 (264a)
Space and water heating			172.3168 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	130.6518	0.1443	18.8571 (268)
Total CO2, kg/year			257.7805 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.1600 (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	403.1998	1.5809	637.4086 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	777.4262	1.5186	1180.6281 (278)
Energy for instantaneous electric shower(s)	478.7637	1.5143	725.0083 (278a)
Space and water heating			1818.0366 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	130.6518	1.5338	200.3981 (282)
Total Primary energy kWh/year			2743.4429 (286)
Dwelling Primary energy Rate (DPER)			54.8700 (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	50.0000 (1b)	x 2.6000 (2b)	= 130.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	130.0000 (5)

2. Ventilation rate

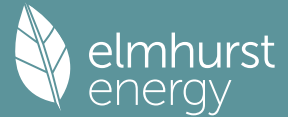
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1538 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4038 (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) = 0.3433 (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	0.4377	0.4291	0.4205	0.3776	0.3690	0.3261	0.3261	0.3175	0.3433	0.3690	0.3862	0.4033 (22b)
Effective ac	0.5958	0.5921	0.5884	0.5713	0.5681	0.5532	0.5532	0.5504	0.5589	0.5681	0.5746	0.5813 (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 Opening Type			12.5000	1.1450	14.3130		(27)
Heatloss Floor 1			50.0000	0.1300	6.5000		(28a)
External Wall 1	41.6000	12.5000	29.1000	0.1800	5.2380		(29a)
Total net area of external elements Aum(A, m2)			91.6000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		26.0510		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							248.3000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				16.0000	0.1600	2.5600	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000 0.0900 0.9360 3.4960 (36)
(33) + (36) + (36a) = 0.0000
29.5470 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 25.5588 25.3993 25.2429 24.5083 24.3709 23.7311 23.7311 23.6126 23.9775 24.3709 24.6489 24.9396 (38)
55.1058 54.9462 54.7899 54.0553 53.9179 53.2781 53.2781 53.1596 53.5245 53.9179 54.1959 54.4866 (39)
Average = Sum(39)m / 12 = 54.0546

HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 1.1021 1.0989 1.0958 1.0811 1.0784 1.0656 1.0656 1.0632 1.0705 1.0784 1.0839 1.0897 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.6901 (42)
Hot water usage for mixer showers 52.5569 51.7671 50.6162 48.4141 46.7890 44.9767 43.9465 45.0888 46.3409 48.2867 50.5361 52.3556 (42a)
Hot water usage for baths 22.7244 22.3869 21.9117 21.0354 20.3792 19.6517 19.2587 19.7306 20.2445 21.0230 21.9173 22.6476 (42b)
Hot water usage for other uses 31.9383 30.7769 29.6155 28.4541 27.2927 26.1314 26.1314 27.2927 28.4541 29.6155 30.7769 31.9383 (42c)
Average daily hot water use (litres/day) 98.5597 (43)

Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 107.2197 104.9310 102.1434 97.9036 94.4609 90.7597 89.3366 92.1121 95.0395 98.9252 103.2304 106.9415 (44)
Energy content (annual) 169.8097 149.4203 156.9906 134.0251 127.1626 111.5996 108.0448 114.0541 117.1932 134.2406 147.0706 167.4445 (45)
Distribution loss (46)m = 0.15 x (45)m 25.4715 22.4130 23.5486 20.1038 19.0744 16.7399 16.2067 17.1081 17.5790 20.1361 22.0606 25.1167 (46)
Water storage loss:
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):
Temperature factor from Table 2b 1.3938 (48)
Enter (49) or (54) in (55) 0.5400 (49)
Total storage loss 0.7527 (55)
If cylinder contains dedicated solar storage 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (56)
Primary loss 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (57)
Combi loss 23.2624 21.0112 23.2624 22.5120 23.2624 22.5120 23.2624 23.2624 22.5120 23.2624 22.5120 23.2624 (59)
Total heat required for water heating calculated for each month 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (61)
WWHRS 216.4047 191.5060 203.5855 179.1170 173.7575 156.6915 154.6398 160.6490 162.2850 180.8355 192.1624 214.0394 (62)
PV diverter -24.0268 -21.2495 -22.2513 -18.4249 -17.1714 -14.6937 -13.7730 -14.6462 -15.2026 -17.9222 -20.3037 -23.5819 (63a)
Solar input -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 (63b)
FGHRS 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (63c)
Output from w/h 192.3778 170.2565 181.3342 160.6920 156.5861 141.9978 140.8668 146.0028 147.0824 162.9133 171.8587 190.4575 (64)
Total per year (kWh/year) = Sum(64)m = 1962.4258 (64)
12Total per year (kWh/year) 1962 (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 93.7377 83.3508 89.4753 80.6368 79.5575 73.1803 73.2008 75.1989 75.0402 81.9109 84.9744 92.9512 (65)

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

Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
(66)m 84.5050 84.5050 84.5050 84.5050 84.5050 84.5050 84.5050 84.5050 84.5050 84.5050 84.5050 84.5050 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 74.2626 82.2193 74.2626 76.7380 74.2626 76.7380 74.2626 74.2626 76.7380 74.2626 76.7380 74.2626 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 147.2339 148.7618 144.9117 136.7153 126.3689 116.6447 110.1484 108.6205 112.4706 120.6670 131.0134 140.7376 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 31.4505 31.4505 31.4505 31.4505 31.4505 31.4505 31.4505 31.4505 31.4505 31.4505 31.4505 31.4505 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 0.0000 0.0000 0.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -67.6040 -67.6040 -67.6040 -67.6040 -67.6040 -67.6040 -67.6040 -67.6040 -67.6040 -67.6040 -67.6040 -67.6040 (71)
Water heating gains (Table 5) 125.9915 124.0340 120.2625 111.9956 106.9321 101.6394 98.3882 101.0738 104.2225 110.0953 118.0201 124.9344 (72)
Total internal gains 398.8396 406.3666 390.7883 376.8005 358.9151 343.3736 331.1507 332.3085 341.7827 356.3764 377.1230 391.2862 (73)

6. Solar gains

[Jan] Area Solar flux g FF Access Gains
m2 Table 6a W/m2 Specific data Specific data factor W
or Table 6b or Table 6c Table 6d

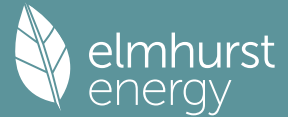
Northeast 5.9200 11.2829 0.6300 0.7000 0.7700 20.4134 (75)
Southeast 2.0000 36.7938 0.6300 0.7000 0.7700 22.4893 (77)
Northwest 4.5800 11.2829 0.6300 0.7000 0.7700 15.7928 (81)

Solar gains 58.6956 112.0065 185.1961 283.0098 365.8660 384.7171 361.9623 296.8614 218.5503 132.4040 72.4939 48.8140 (83)
Total gains 457.5351 518.3731 575.9844 659.8103 724.7811 728.0907 693.1130 629.1699 560.3330 488.7804 449.6169 440.1002 (84)

7. Mean internal temperature (heating season)

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

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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	62.5816	62.7634	62.9425	63.7978	63.9605	64.7285	64.7285	64.8728	64.4305	63.9605	63.6323	63.2929
alpha	5.1721	5.1842	5.1962	5.2532	5.2640	5.3152	5.3152	5.3249	5.2954	5.2640	5.2422	5.2195
util living area	0.9863	0.9731	0.9401	0.8364	0.6578	0.4639	0.3375	0.3871	0.6325	0.8921	0.9719	0.9885 (86)
MIT	19.9801	20.1727	20.4493	20.7769	20.9461	20.9929	20.9989	20.9979	20.9673	20.7276	20.3098	19.9531 (87)
Th 2	19.9991	20.0017	20.0043	20.0163	20.0185	20.0291	20.0291	20.0310	20.0250	20.0185	20.0140	20.0092 (88)
util rest of house	0.9822	0.9654	0.9235	0.7984	0.5990	0.3955	0.2634	0.3064	0.5536	0.8560	0.9625	0.9851 (89)
MIT 2	18.8390	19.0821	19.4232	19.8086	19.9782	20.0254	20.0287	20.0303	20.0055	19.7679	19.2661	18.8126 (90)
Living area fraction									FLA = Living area / (4) =			0.4600 (91)
MIT	19.3639	19.5838	19.8952	20.2540	20.4235	20.4705	20.4750	20.4754	20.4479	20.2093	19.7462	19.3372 (92)
Temperature adjustment												0.0000
adjusted MIT	19.3639	19.5838	19.8952	20.2540	20.4235	20.4705	20.4750	20.4754	20.4479	20.2093	19.7462	19.3372 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9789	0.9614	0.9214	0.8082	0.6239	0.4268	0.2975	0.3436	0.5887	0.8638	0.9593	0.9821 (94)
Useful gains	447.8624	498.3755	530.7077	533.2582	452.1856	310.7578	206.2219	216.1588	329.8891	422.2086	431.3331	432.2056 (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	830.1097	806.8191	733.9218	613.7450	470.3501	312.7670	206.4541	216.6457	339.7709	518.1147	685.3707	824.7750 (97)
Space heating kWh	284.3920	207.2741	151.1913	57.9505	13.5144	0.0000	0.0000	0.0000	0.0000	71.3541	182.9071	292.0716 (98a)
Space heating requirement - total per year (kWh/year)												1260.6551
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	284.3920	207.2741	151.1913	57.9505	13.5144	0.0000	0.0000	0.0000	0.0000	71.3541	182.9071	292.0716 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1260.6551
Space heating per m2										(98c) / (4) =		25.2131 (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	284.3920	207.2741	151.1913	57.9505	13.5144	0.0000	0.0000	0.0000	0.0000	71.3541	182.9071	292.0716 (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)	308.1170	224.5657	163.8042	62.7849	14.6418	0.0000	0.0000	0.0000	0.0000	77.3067	198.1658	316.4373 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	192.3778	170.2565	181.3342	160.6920	156.5861	141.9978	140.8668	146.0028	147.0824	162.9133	171.8587	190.4575 (64)
Efficiency of water heater (217)m	84.9348	84.5021	83.6550	82.0028	80.4478	79.8000	79.8000	79.8000	79.8000	82.3419	84.1998	79.8000 (216)
Fuel for water heating, kWh/month	226.5006	201.4820	216.7643	195.9591	194.6431	177.9421	176.5248	182.9609	184.3137	197.8498	204.1083	224.0269 (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	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	15.4303	12.3788	11.1457	8.1658	6.3075	5.1533	5.7539	7.4792	9.7147	12.7462	14.3968	15.8592 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-23.8319	-33.8314	-48.9876	-55.5376	-60.3279	-56.5260	-55.8772	-52.5565	-46.7283	-38.9382	-26.3015	-20.5810 (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	-12.7730	-26.9447	-53.6721	-80.7632	-106.9058	-107.4073	-106.0950	-89.7380	-65.6863	-38.5287	-17.0574	-10.0911 (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												1365.8235 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2383.0757 (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)												124.5314 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1235.6876 (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)

Full SAP Calculation Printout



Total delivered energy for all uses

2723.7429 (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	1365.8235	0.2100	286.8229 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2383.0757	0.2100	500.4459 (264)
Space and water heating			787.2688 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	124.5314	0.1443	17.9737 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.0251	0.1344	-69.8924
PV Unit electricity exported	-715.6625	0.1259	-90.0679
Total			-159.9603 (269)
Total CO2, kg/year			657.2116 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.1400 (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	1365.8235	1.1300	1543.3805 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2383.0757	1.1300	2692.8755 (278)
Space and water heating			4236.2561 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	124.5314	1.5338	191.0104 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-520.0251	1.4967	-778.3300
PV Unit electricity exported	-715.6625	0.4620	-330.6104
Total			-1108.9404 (283)
Total Primary energy kWh/year			3448.4269 (286)
Target Primary Energy Rate (TPER)			68.9700 (287)

Energy Report



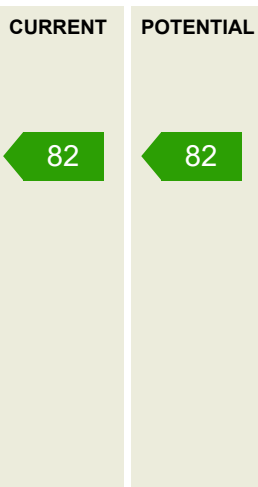
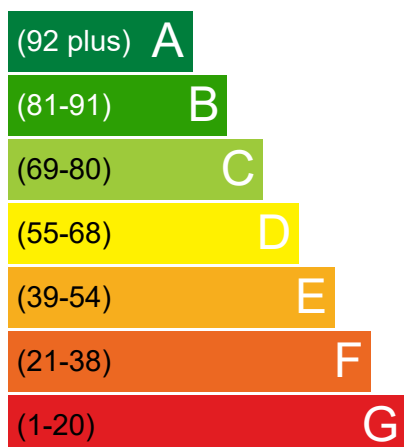
Dwelling Address	
Reference	Block C Flat 1-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	50

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

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

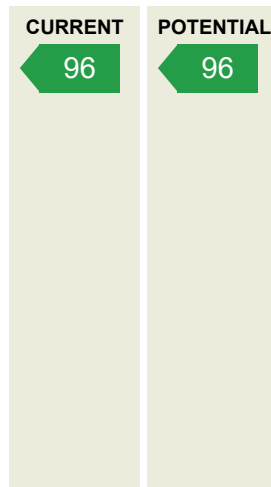
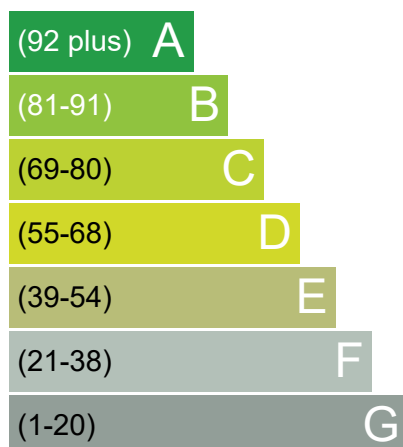
Energy Efficiency Rating

Most energy efficient - lower running costs

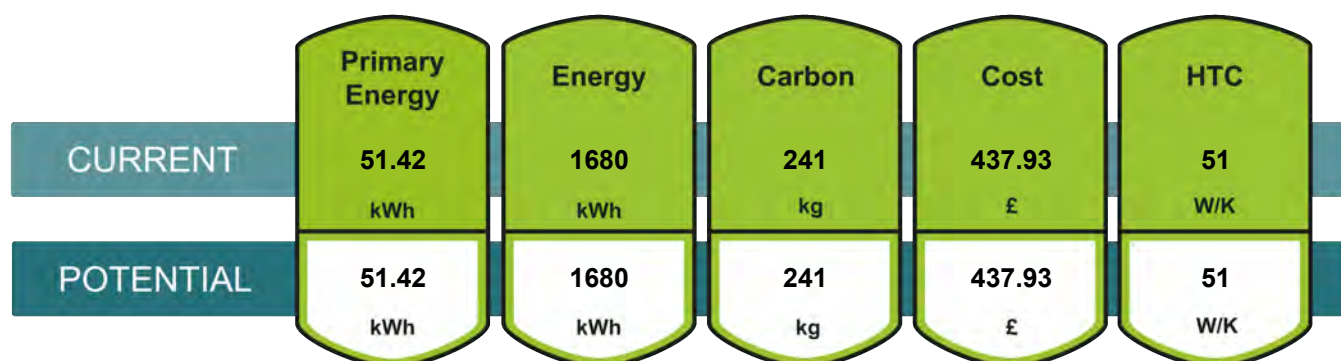


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£34	£34	
Heating		£76	£76	
Hot Water		£327	£327	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£438	£438	

Estimated energy use and potential savings



Space Heating

293
kWh per year



Water Heating

778
kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

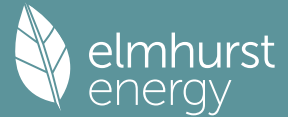
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block C Flat 2				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	83 B	DER	4.36	TER	11.02	
Environmental	97 A	% DER < TER				60.44
CO ₂ Emissions (t/year)	0.28	DFEE	29.84	TFEE	32.40	
Compliance Check	See BREL	% DFEE < TFEE				7.88
% DPER < TPER	19.31	DPER	46.32	TPER	57.41	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		
Dwelling volume			

2. Ventilation rate

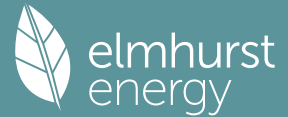
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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	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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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												
Opening Type 1			13.1000	1.3258	17.3674			(27)				
Heatloss Floor 1			70.0000	0.1300	9.1000	110.0000	7700.0000	(28a)				
External Wall 1	49.4000	13.1000	36.3000	0.1800	6.5340	190.0000	6896.9997	(29a)				
Total net area of external elements Aum(A, m2)			119.4000					(31)				
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	33.0014			(33)				
Main dwelling												
Party Ceiling 1			70.0000			20.0000	1400.0000	(32b)				
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		15996.9997	(34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							228.5286	(35)				
List of Thermal Bridges												
K1 Element					Length	Psi-value	Total					
E5 Ground floor (normal)					28.0000	0.0000	0.0000					
E16 Corner (normal)					10.4000	0.0000	0.0000					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								0.0000 (36)				
Point Thermal bridges							(36a) =	0.0000				
Total fabric heat loss						(33) + (36) + (36a) =	33.0014	(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

Full SAP Calculation Printout



(38)m	31.4408	31.3860	31.3323	31.0801	31.0329	30.8132	30.8132	30.7726	30.8979	31.0329	31.1284	31.2282 (38)
Heat transfer coeff	64.4422	64.3875	64.3338	64.0815	64.0344	63.8147	63.8147	63.7740	63.8993	64.0344	64.1298	64.2296 (39)
Average = Sum(39)m / 12 =												64.0813
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9206	0.9198	0.9191	0.9155	0.9148	0.9116	0.9116	0.9111	0.9128	0.9148	0.9161	0.9176 (40)
HLP (average)												0.9154
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2461 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	26.1376	25.7430	25.1817	24.3411	23.5836	22.5407	21.7495	22.7170	23.2247	24.2581	25.3324	26.1169 (42b)
Hot water usage for other uses	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326 (42c)
Average daily hot water use (litres/day)												58.4472 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	63.7702	62.0071	60.0774	57.8683	55.7423	53.3310	52.5398	54.8757	56.7519	59.1537	61.5965	63.7494 (44)
Energy conte	93.8807	82.0480	85.8493	75.5905	71.8296	61.6755	58.0580	64.5897	65.8294	76.2256	83.2498	93.6207 (45)
Energy content (annual)										Total = Sum(45)m =		912.4468
Distribution loss (46)m = 0.15 x (45)m	14.0821	12.3072	12.8774	11.3386	10.7744	9.2513	8.7087	9.6885	9.8744	11.4338	12.4875	14.0431 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195 (64)
										Total per year (kWh/year) = Sum(64)m =		1552.9488 (64)
12Total per year (kWh/year)												1553 (64)
Electric shower(s)	49.5554	44.1543	48.2148	46.0108	46.8741	44.7134	46.2038	46.8741	46.0108	48.2148	47.3081	49.5554 (64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		563.6896 (64a)
Heat gains from water heating, kWh/month	87.1232	77.6270	84.1176	78.7517	79.1209	73.8006	74.3743	76.7137	75.5062	80.9177	81.6228	87.0368 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306 (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)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450 (71)
Water heating gains (Table 5)	117.1011	115.5164	113.0613	109.3774	106.3453	102.5009	99.9654	103.1098	104.8697	108.7604	113.3650	116.9849 (72)
Total internal gains	472.1333	483.4221	464.9817	453.6826	433.4179	419.9110	405.3021	406.3991	416.6863	428.1923	450.0294	463.3119 (73)

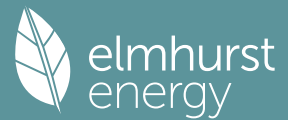
6. Solar gains

[Jan]												Gains
				Area	Solar flux		g		FF		Access	
				m2	Table 6a		Specific data		Specific data		factor	
					W/m2		or Table 6b		or Table 6c		Table 6d	W
Northeast				6.2000		11.2829		0.3500		0.0000	0.7700	18.8527 (75)
Southeast				2.1000		36.7938		0.3500		0.0000	0.7700	20.8235 (77)
Northwest				4.8000		11.2829		0.3500		0.0000	0.7700	14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	526.4051	586.9771	636.1808	715.2708	771.5672	775.4744	739.8386	680.7815	618.7081	550.5994	517.0577	508.4480 (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	68.9549	69.0136	69.0712	69.3431	69.3942	69.6331	69.6331	69.6775	69.5409	69.3942	69.2909	69.1832
alpha	5.5970	5.6009	5.6047	5.6229	5.6263	5.6422	5.6422	5.6452	5.6361	5.6263	5.6194	5.6122
util living area	0.9906	0.9816	0.9595	0.8810	0.7218	0.5199	0.3785	0.4288	0.6787	0.9171	0.9798	0.9922 (86)

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Living	20.0458	20.2079	20.4453	20.7500	20.9336	20.9909	20.9987	20.9975	20.9638	20.7227	20.3375	20.0111
Non living	19.0435	19.2486	19.5448	19.9082	20.1012	20.1524	20.1572	20.1572	20.1328	19.8858	19.4163	19.0014
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	20.5119	20.2079	20.4453	20.7500	20.9336	20.9909	20.9987	20.9975	20.9638	20.7227	20.3375	20.1494 (87)
Th 2	20.1500	20.1507	20.1513	20.1544	20.1550	20.1576	20.1576	20.1581	20.1566	20.1550	20.1538	20.1526 (88)
util rest of house												
	0.9880	0.9767	0.9487	0.8525	0.6702	0.4543	0.3066	0.3514	0.6081	0.8900	0.9734	0.9900 (89)
MIT 2	19.7089	19.2486	19.5448	19.9082	20.1012	20.1524	20.1572	20.1572	20.1328	19.8858	19.4163	19.2089 (90)
Living area fraction												
MIT	20.0186	19.6186	19.8921	20.2329	20.4222	20.4759	20.4818	20.4813	20.4533	20.2086	19.7716	19.5716 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0186	19.6186	19.8921	20.2329	20.4222	20.4759	20.4818	20.4813	20.4533	20.2086	19.7716	19.5716 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9875	0.9728	0.9447	0.8554	0.6871	0.4794	0.3344	0.3813	0.6338	0.8920	0.9698	0.9882 (94)
Useful gains	519.8338	571.0309	601.0269	611.8322	530.1517	371.7300	247.3705	259.5731	392.1414	491.1252	501.4527	502.4232 (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	1012.9433	947.6931	861.5664	726.2278	558.5232	374.9658	247.7142	260.2806	405.9731	615.2823	812.6297	987.3151 (97)
Space heating kWh	366.8735	253.1170	193.8415	82.3649	21.1084	0.0000	0.0000	0.0000	0.0000	92.3728	224.0475	360.7596 (98a)
Space heating requirement - total per year (kWh/year)												1594.4851
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	366.8735	253.1170	193.8415	82.3649	21.1084	0.0000	0.0000	0.0000	0.0000	92.3728	224.0475	360.7596 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1594.4851
Space heating per m2										(98c) / (4) =		22.7784 (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 %)												306.2555 (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	366.8735	253.1170	193.8415	82.3649	21.1084	0.0000	0.0000	0.0000	0.0000	92.3728	224.0475	360.7596 (98)
Space heating efficiency (main heating system 1)	306.2555	306.2555	306.2555	306.2555	306.2555	0.0000	0.0000	0.0000	0.0000	306.2555	306.2555	306.2555 (210)
Space heating fuel (main heating system)	119.7933	82.6490	63.2940	26.8942	6.8924	0.0000	0.0000	0.0000	0.0000	30.1620	73.1571	117.7969 (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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195 (64)
Efficiency of water heater (217)m	185.7148	185.7148	185.7148	185.7148	185.7148	185.7148	185.7148	185.7148	185.7148	185.7148	185.7148	185.7148 (216)
Fuel for water heating, kWh/month	79.8426	70.6365	75.5180	69.0492	67.9689	61.5565	60.5535	64.0706	63.7932	70.3360	73.1734	79.7026 (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	23.9244	19.1931	17.2812	12.6610	9.7797	7.9901	8.9214	11.5963	15.0625	19.7628	22.3220	24.5894 (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												520.6388 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												185.7148
Water heating fuel used												836.2009 (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)												193.0839 (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												2113.6132 (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	520.6388	0.1566	81.5394 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	836.2009	0.1404	117.3897 (264)
Energy for instantaneous electric shower(s)	563.6896	0.1391	78.4217 (264a)
Space and water heating			198.9291 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	193.0839	0.1443	27.8680 (268)
Total CO2, kg/year			305.2188 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.3600 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	520.6388	1.5798	822.4993 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	836.2009	1.5191	1270.2428 (278)
Energy for instantaneous electric shower(s)	563.6896	1.5143	853.6145 (278a)
Space and water heating			2092.7421 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	193.0839	1.5338	296.1585 (282)
Total Primary energy kWh/year			3242.5152 (286)
Dwelling Primary energy Rate (DPER)			46.3200 (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	70.0000 (1b)	x 2.6000 (2b)	= 182.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	182.0000 (5)

2. Ventilation rate

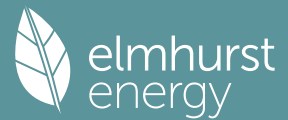
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1099 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3599 (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) = 0.3059 (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	0.3900	0.3824	0.3747	0.3365	0.3288	0.2906	0.2906	0.2830	0.3059	0.3288	0.3441	0.3594 (22b)
Effective ac	0.5761	0.5731	0.5702	0.5566	0.5541	0.5422	0.5422	0.5400	0.5468	0.5541	0.5592	0.5646 (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 Opening Type			13.1000	1.1450	15.0000		(27)
Heatloss Floor 1			70.0000	0.1300	9.1000		(28a)
External Wall 1	49.4000	13.1000	36.3000	0.1800	6.5340		(29a)
Total net area of external elements Aum(A, m2)			119.4000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		30.6340		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							238.5286 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000
0.0900
0.9360
5.4160 (36)
0.0000
(33) + (36) + (36a) = 36.0500 (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	34.5983	34.4209	34.2470	33.4303	33.2775	32.5662	32.5662	32.4345	32.8402	33.2775	33.5866	33.9098 (38)
Heat transfer coeff	70.6483	70.4709	70.2970	69.4803	69.3275	68.6162	68.6162	68.4845	68.8902	69.3275	69.6366	69.9598 (39)
Average = Sum(39)m / 12 =												69.4796

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0093	1.0067	1.0042	0.9926	0.9904	0.9802	0.9802	0.9783	0.9841	0.9904	0.9948	0.9994 (40)
HLP (average)												0.9926
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy
Hot water usage for mixer showers
Hot water usage for baths
Hot water usage for other uses
Average daily hot water use (litres/day)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot water usage for mixer showers	61.8798	60.9498	59.5947	57.0020	55.0887	52.9549	51.7420	53.0869	54.5611	56.8521	59.5005	61.6427 (42a)
Hot water usage for baths	26.7336	26.3365	25.7774	24.7465	23.9746	23.1187	22.6564	23.2116	23.8161	24.7319	25.7840	26.6432 (42b)
Hot water usage for other uses	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326 (42c)
Average daily hot water use (litres/day)												116.0487 (43)

Daily hot water use

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	126.2459	123.5505	120.2678	115.2758	111.2220	106.8639	105.1887	108.4572	111.9043	116.4797	121.5487	125.9184 (44)
Energy conte	199.9426	175.9342	184.8472	157.8067	149.7262	131.4016	127.2166	134.2926	137.9892	158.0618	173.1684	197.1578 (45)
Energy content (annual)												1927.5450
Distribution loss (46)m = 0.15 x (45)m	29.9914	26.3901	27.7271	23.6710	22.4589	19.7102	19.0825	20.1439	20.6984	23.7093	25.9753	29.5737 (46)
Water storage loss:												150.0000 (47)
Store volume												1.3938 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.7527 (55)
Enter (49) or (54) in (55)												
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (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	246.5375	218.0199	231.4421	202.8986	196.3211	176.4934	173.8115	180.8875	183.0811	204.6567	218.2602	243.7527 (62)
WWHRS	-28.2888	-25.0189	-26.1983	-21.6933	-20.2173	-17.3001	-16.2161	-17.2442	-17.8994	-21.1014	-23.9053	-27.7650 (63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878 (64)
12Total per year (kWh/year)												2213.3143 (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	103.7568	92.1667	98.7376	88.5442	87.0599	79.7645	79.5754	81.9282	81.9549	89.8315	93.6520	102.8309 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450 (71)
Water heating gains (Table 5)	139.4581	137.1528	132.7118	122.9781	117.0160	110.7840	106.9562	110.1186	113.8262	120.7412	130.0722	138.2136 (72)
Total internal gains	497.4904	508.0585	487.6322	470.2832	447.0886	428.1941	412.2929	413.4079	425.6429	443.1731	469.7366	487.5406 (73)

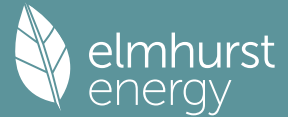
6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast	6.2000	11.2829	0.6300	0.7000	0.7700	21.3789 (75)						
Southeast	2.1000	36.7938	0.6300	0.7000	0.7700	23.6138 (77)						
Northwest	4.8000	11.2829	0.6300	0.7000	0.7700	16.5514 (81)						
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843 (83)
Total gains	559.0345	625.4899	681.7720	766.9243	830.5499	831.4030	791.6573	724.5575	654.7355	581.9828	545.7467	538.7249 (84)

7. Mean internal temperature (heating season)

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

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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	65.6499	65.8152	65.9780	66.7535	66.9007	67.5942	67.5942	67.7242	67.3254	66.9007	66.6037	66.2960
alpha	5.3767	5.3877	5.3985	5.4502	5.4600	5.5063	5.5063	5.5149	5.4884	5.4600	5.4402	5.4197
util living area	0.9904	0.9814	0.9591	0.8810	0.7222	0.5207	0.3802	0.4323	0.6868	0.9201	0.9802	0.9920 (86)
MIT	19.9779	20.1496	20.4029	20.7297	20.9264	20.9897	20.9985	20.9970	20.9579	20.6960	20.2911	19.9518 (87)
Th 2	20.0756	20.0777	20.0798	20.0895	20.0913	20.0998	20.0998	20.1014	20.0966	20.0913	20.0877	20.0838 (88)
util rest of house	0.9876	0.9762	0.9475	0.8507	0.6671	0.4507	0.3030	0.3492	0.6114	0.8921	0.9736	0.9897 (89)
MIT 2	18.8976	19.1158	19.4326	19.8267	20.0331	20.0942	20.0993	20.1004	20.0696	19.7994	19.3039	18.8707 (90)
Living area fraction									FLA = Living area / (4) =			0.3857 (91)
MIT	19.3142	19.5145	19.8069	20.1750	20.3776	20.4396	20.4462	20.4462	20.4122	20.1453	19.6847	19.2877 (92)
Temperature adjustment												0.0000
adjusted MIT	19.3142	19.5145	19.8069	20.1750	20.3776	20.4396	20.4462	20.4462	20.4122	20.1453	19.6847	19.2877 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9846	0.9721	0.9434	0.8538	0.6851	0.4774	0.3328	0.3813	0.6388	0.8940	0.9699	0.9870 (94)
Useful gains	550.4436	608.0413	643.1520	654.7991	569.0363	396.9295	263.4927	276.2476	418.2267	520.2815	529.3148	531.7437 (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	1060.7307	1029.8977	935.4327	783.3911	601.5978	400.6919	263.9084	277.1027	434.8489	661.7498	876.3571	1055.5297 (97)
Space heating kWh	379.6536	283.4875	217.4568	92.5862	24.2257	0.0000	0.0000	0.0000	0.0000	105.2524	249.8705	389.6967 (98a)
Space heating requirement - total per year (kWh/year)												1742.2295
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	379.6536	283.4875	217.4568	92.5862	24.2257	0.0000	0.0000	0.0000	0.0000	105.2524	249.8705	389.6967 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1742.2295
Space heating per m2										(98c) / (4) =		24.8890 (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	379.6536	283.4875	217.4568	92.5862	24.2257	0.0000	0.0000	0.0000	0.0000	105.2524	249.8705	389.6967 (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)	411.3257	307.1371	235.5979	100.3101	26.2467	0.0000	0.0000	0.0000	0.0000	114.0329	270.7156	422.2066 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878 (64)
Efficiency of water heater (217)m	85.2888	84.9206	84.1896	82.6321	80.7902	79.8000	79.8000	79.8000	79.8000	82.8606	84.6243	79.8000 (216)
Fuel for water heating, kWh/month	255.8937	227.2723	243.7874	219.2918	217.9767	199.4903	197.4880	205.0668	206.9946	221.5232	229.6679	253.0117 (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	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	20.9948	16.8428	15.1651	11.1106	8.5821	7.0117	7.8289	10.1763	13.2180	17.3428	19.5886	21.5783 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-32.8701	-46.4063	-66.8089	-75.2540	-81.2811	-75.9327	-75.0050	-70.7452	-63.2427	-53.1331	-36.1640	-28.4114 (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	-18.3768	-38.6803	-76.9148	-115.5671	-152.8459	-153.5740	-151.7560	-128.4671	-94.1378	-55.3206	-24.5385	-14.5294 (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												1887.5725 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2677.4642 (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)												169.4401 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1729.9627 (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

3090.5142 (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	1887.5725	0.2100	396.3902 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2677.4642	0.2100	562.2675 (264)
Space and water heating			958.6577 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	169.4401	0.1443	24.4554 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	0.1345	-94.8895
PV Unit electricity exported	-1024.7084	0.1259	-128.9966
Total			-223.8861 (269)
Total CO2, kg/year			771.1563 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.0200 (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	1887.5725	1.1300	2132.9570 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2677.4642	1.1300	3025.5346 (278)
Space and water heating			5158.4916 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	169.4401	1.5338	259.8929 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	1.4973	-1055.9481
PV Unit electricity exported	-1024.7084	0.4621	-473.5061
Total			-1529.4542 (283)
Total Primary energy kWh/year			4019.0310 (286)
Target Primary Energy Rate (TPER)			57.4100 (287)

Energy Report



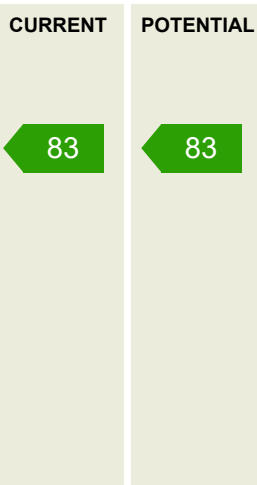
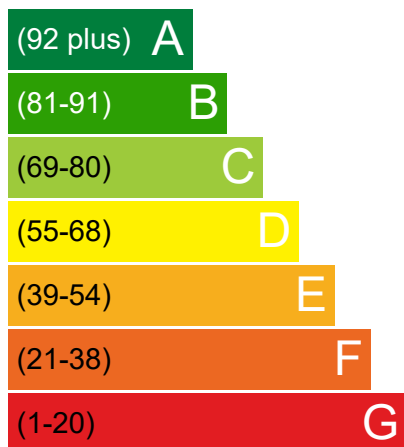
Dwelling Address	
Reference	Block C Flat 2-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

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

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

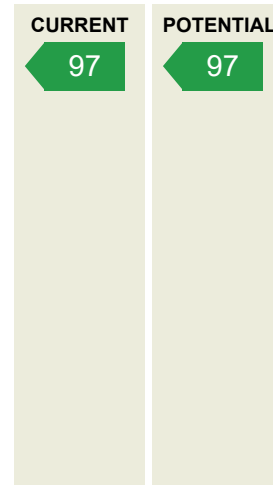
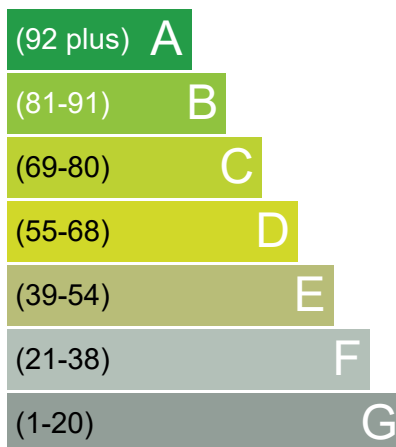
Energy Efficiency Rating

Most energy efficient - lower running costs

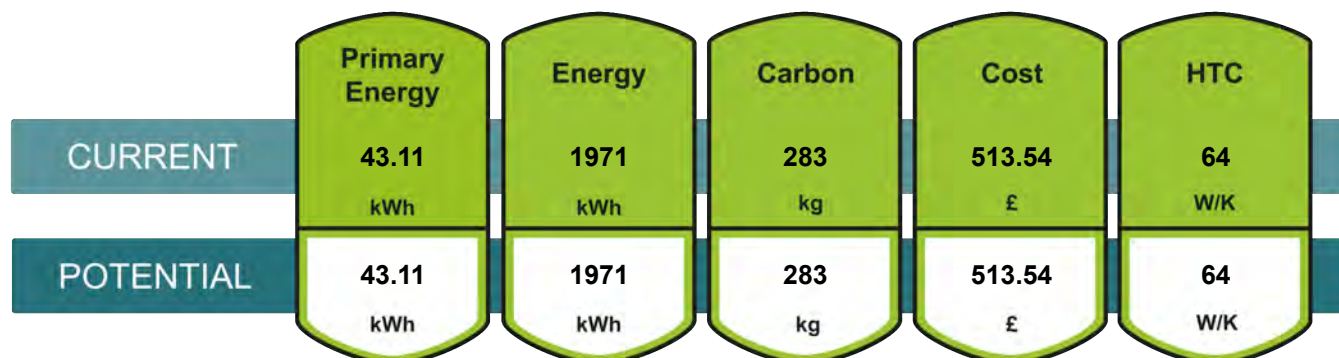


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£50	£50	
Heating		£98	£98	
Hot Water		£365	£365	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£514	£514	

Estimated energy use and potential savings



Space Heating

378

kWh per year



Water Heating

836

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

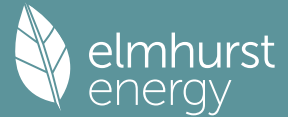
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

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Property Reference	Block C Flat 3				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	82 B	DER	4.46	TER	11.71	
Environmental	96 A	% DER < TER				61.91
CO ₂ Emissions (t/year)	0.3	DFEE	33.93	TFEE	36.51	
Compliance Check	See BREL	% DFEE < TFEE				7.07
% DPER < TPER	22.65	DPER	47.32	TPER	61.18	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.0000		
Dwelling volume			

2. Ventilation rate

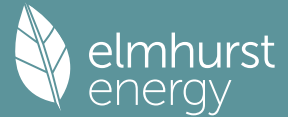
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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	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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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											
Opening Type 1			13.1000	1.3258	17.3674			(27)			
Heatloss Floor 1			73.0000	0.1300	9.4900	110.0000	8030.0000	(28a)			
External Wall 1	75.4000	13.1000	62.3000	0.1800	11.2140	190.0000	11836.9995	(29a)			
Total net area of external elements Aum(A, m2)			148.4000					(31)			
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	38.0714			(33)			
Main dwelling											
Party Ceiling 1			73.0000			20.0000	1460.0000	(32b)			
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		21326.9995	(34)			
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							292.1507	(35)			
List of Thermal Bridges											
K1 Element					Length	Psi-value	Total				
E5 Ground floor (normal)					28.0000	0.0000	0.0000				
E16 Corner (normal)					10.4000	0.0000	0.0000				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								0.0000 (36)			
Point Thermal bridges							(36a) =	0.0000			
Total fabric heat loss						(33) + (36) + (36a) =	38.0714	(37)			
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	32.7883	32.7312	32.6752	32.4121	32.3629	32.1338	32.1338	32.0914	32.2221	32.3629	32.4625	32.5665 (38)
Heat transfer coeff	70.8597	70.8026	70.7466	70.4835	70.4343	70.2052	70.2052	70.1628	70.2935	70.4343	70.5339	70.6380 (39)
Average = Sum(39)m / 12 =												70.4833
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9707	0.9699	0.9691	0.9655	0.9649	0.9617	0.9617	0.9611	0.9629	0.9649	0.9662	0.9676 (40)
HLP (average)												0.9655
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3167 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	26.6351	26.2331	25.6611	24.8045	24.0325	22.9698	22.1635	23.1494	23.6668	24.7198	25.8146	26.6140 (42b)
Hot water usage for other uses	38.3553	36.9606	35.5658	34.1711	32.7764	31.3816	31.3816	32.7764	34.1711	35.5658	36.9606	38.3553 (42c)
Average daily hot water use (litres/day)												59.5656 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	64.9905	63.1936	61.2269	58.9756	56.8088	54.3514	53.5451	55.9258	57.8379	60.2857	62.7752	64.9693 (44)
Energy conte	95.6772	83.6180	87.4920	77.0368	73.2039	62.8556	59.1690	65.8257	67.0891	77.6842	84.8428	95.4122 (45)
Energy content (annual)										Total = Sum(45)m =		929.9064
Distribution loss (46)m = 0.15 x (45)m	14.3516	12.5427	13.1238	11.5555	10.9806	9.4283	8.8753	9.8739	10.0634	11.6526	12.7264	14.3118 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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	150.0760	132.7524	141.8908	129.6808	127.6027	115.4996	113.5678	120.2245	119.7331	132.0830	137.4868	149.8110 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	150.0760	132.7524	141.8908	129.6808	127.6027	115.4996	113.5678	120.2245	119.7331	132.0830	137.4868	149.8110 (64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				1570.4084 (64)
Electric shower(s)	50.5030	44.9986	49.1368	46.8906	47.7705	45.5684	47.0874	47.7705	46.8906	49.1368	48.2128	50.5030 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												574.4692 (64a)
Heat gains from water heating, kWh/month	87.9575	78.3602	84.8943	79.4526	79.8020	74.4068	74.9646	77.3487	76.1450	81.6332	82.3786	87.8694 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	105.2440	116.5201	105.2440	108.7521	105.2440	108.7521	105.2440	105.2440	108.7521	105.2440	108.7521	105.2440 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	204.1952	206.3141	200.9745	189.6072	175.2580	161.7717	152.7621	150.6432	155.9828	167.3501	181.6993	195.1856 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835 (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)	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680 (71)
Water heating gains (Table 5)	118.2224	116.6074	114.1053	110.3508	107.2607	103.3428	100.7588	103.9633	105.7569	109.7221	114.4148	118.1040 (72)
Total internal gains	485.4120	497.1921	478.0742	466.4606	445.5132	431.6171	416.5154	417.6010	428.2423	440.0666	462.6167	476.2840 (73)

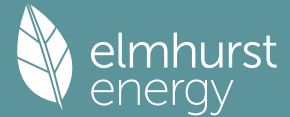
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	539.6838	600.7471	649.2734	728.0489	783.6625	787.1805	751.0519	691.9833	630.2640	562.4738	529.6450	521.4201	(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	83.6042	83.6716	83.7379	84.0503	84.1091	84.3835	84.3835	84.4346	84.2776	84.1091	83.9904	83.8666
alpha	6.5736	6.5781	6.5825	6.6034	6.6073	6.6256	6.6256	6.6290	6.6185	6.6073	6.5994	6.5911
util living area	0.9969	0.9929	0.9813	0.9264	0.7795	0.5647	0.4106	0.4648	0.7333	0.9532	0.9920	0.9975 (86)

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Living	20.1390	20.2749	20.4813	20.7618	20.9410	20.9936	20.9993	20.9985	20.9695	20.7378	20.3925	20.1102
Non living	19.1101	19.2835	19.5437	19.8824	20.0684	20.1123	20.1152	20.1154	20.0965	19.8622	19.4363	19.0754
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	20.5595	20.2749	20.4813	20.7618	20.9410	20.9936	20.9993	20.9985	20.9695	20.7378	20.3925	20.2347 (87)
Th 2	20.1078	20.1085	20.1091	20.1122	20.1127	20.1154	20.1154	20.1158	20.1143	20.1127	20.1116	20.1104 (88)
util rest of house												
MIT 2	0.9957	0.9904	0.9744	0.9013	0.7231	0.4896	0.3285	0.3764	0.6543	0.9313	0.9886	0.9966 (89)
Living area fraction	19.7101	19.2835	19.5437	19.8824	20.0684	20.1123	20.1152	20.1154	20.0965	19.8622	19.4363	19.2619 (90)
MIT	20.0475	19.6773	19.9162	20.2317	20.4150	20.4624	20.4664	20.4662	20.4433	20.2100	19.8161	19.6483 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0475	19.6773	19.9162	20.2317	20.4150	20.4624	20.4664	20.4662	20.4433	20.2100	19.8161	19.6483 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9956	0.9888	0.9725	0.9051	0.7432	0.5194	0.3611	0.4116	0.6849	0.9342	0.9871	0.9960 (94)
Useful gains	537.3229	593.9950	631.4232	658.9345	582.4545	408.8786	271.2382	284.8267	431.6710	525.4454	522.8137	519.3181 (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	1115.8658	1046.2724	949.1497	798.7008	613.8380	411.5718	271.4427	285.2990	445.8932	676.8772	896.9189	1091.2394 (97)
Space heating kWh	430.4359	303.9304	236.3885	100.6317	23.3493	0.0000	0.0000	0.0000	0.0000	112.6652	269.3558	425.5094 (98a)
Space heating requirement - total per year (kWh/year)												1902.2662
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	430.4359	303.9304	236.3885	100.6317	23.3493	0.0000	0.0000	0.0000	0.0000	112.6652	269.3558	425.5094 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1902.2662
Space heating per m2										(98c) / (4) =		26.0584 (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 %)	305.9557 (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	430.4359	303.9304	236.3885	100.6317	23.3493	0.0000	0.0000	0.0000	0.0000	112.6652	269.3558	425.5094 (98)
Space heating efficiency (main heating system 1)	305.9557	305.9557	305.9557	305.9557	305.9557	0.0000	0.0000	0.0000	0.0000	305.9557	305.9557	305.9557 (210)
Space heating fuel (main heating system)	140.6857	99.3380	77.2623	32.8909	7.6316	0.0000	0.0000	0.0000	0.0000	36.8240	88.0375	139.0755 (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	150.0760	132.7524	141.8908	129.6808	127.6027	115.4996	113.5678	120.2245	119.7331	132.0830	137.4868	149.8110 (64)
Efficiency of water heater (217)m	184.7044	184.7044	184.7044	184.7044	184.7044	184.7044	184.7044	184.7044	184.7044	184.7044	184.7044	184.7044 (216)
Fuel for water heating, kWh/month	81.2520	71.8729	76.8205	70.2099	69.0849	62.5321	61.4862	65.0902	64.8242	71.5105	74.4361	81.1085 (219)

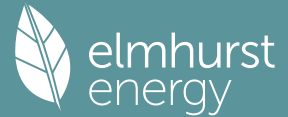
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)
Lighting	25.1221	20.1539	18.1464	13.2948	10.2693	8.3901	9.3680	12.1769	15.8165	20.7522	23.4395	25.8203 (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												621.7457 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												184.7044
Water heating fuel used												850.2280 (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)												202.7499 (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												2249.1928 (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	621.7457	0.1565	97.3288 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	850.2280	0.1404	119.3699 (264)
Energy for instantaneous electric shower(s)	574.4692	0.1391	79.9214 (264a)
Space and water heating			216.6987 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	202.7499	0.1443	29.2631 (268)
Total CO2, kg/year			325.8832 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.4600 (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	621.7457	1.5795	982.0655 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	850.2280	1.5191	1291.5925 (278)
Energy for instantaneous electric shower(s)	574.4692	1.5143	869.9383 (278a)
Space and water heating			2273.6580 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	202.7499	1.5338	310.9846 (282)
Total Primary energy kWh/year			3454.5809 (286)
Dwelling Primary energy Rate (DPER)			47.3200 (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	73.0000 (1b)	x 2.6000 (2b)	= 189.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	73.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	189.8000 (5)

2. Ventilation rate

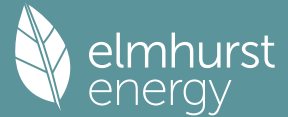
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1581 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4081 (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) = 0.3469 (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	0.4422	0.4336	0.4249	0.3815	0.3729	0.3295	0.3295	0.3208	0.3469	0.3729	0.3902	0.4076 (22b)
Effective ac	0.5978	0.5940	0.5903	0.5728	0.5695	0.5543	0.5543	0.5515	0.5602	0.5695	0.5761	0.5830 (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 Opening Type			13.1000	1.1450	15.0000		(27)
Heatloss Floor 1			73.0000	0.1300	9.4900		(28a)
External Wall 1	75.4000	13.1000	62.3000	0.1800	11.2140		(29a)
Total net area of external elements Aum (A, m2)			148.4000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.7040		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							302.1507 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000 0.0900 0.9360

5.4160 (36)
0.0000
(33) + (36) + (36a) = 41.1200 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	37.4418	37.2039	36.9708	35.8758	35.6710	34.7173	34.7173	34.5407	35.0846	35.6710	36.0854	36.5187
Heat transfer coeff	78.5618	78.3239	78.0908	76.9958	76.7910	75.8373	75.8373	75.6607	76.2046	76.7910	77.2054	77.6387
Average = Sum(39)m / 12 =												

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.0762	1.0729	1.0697	1.0547	1.0519	1.0389	1.0389	1.0364	1.0439	1.0519	1.0576	1.0635
HLP (average)												1.0547
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy
Hot water usage for mixer showers
Hot water usage for baths
Hot water usage for other uses
Average daily hot water use (litres/day)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
63.0631	62.1154	60.7344	58.0921	56.1421	53.9675	52.7315	54.1021	55.6045	57.9393	60.6384	62.8215	62.8215
27.2424	26.8378	26.2681	25.2176	24.4310	23.5588	23.0876	23.6534	24.2694	25.2027	26.2748	27.1503	27.1503
38.3553	36.9606	35.5658	34.1711	32.7764	31.3816	31.3816	32.7764	34.1711	35.5658	36.9606	38.3553	38.3553
Average daily hot water use (litres/day)												

Daily hot water use

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
128.6609	125.9138	122.5683	117.4808	113.3495	108.9079	107.2008	110.5318	114.0450	118.7078	123.8738	128.3271	128.3271
Energy conte	203.7674	179.2996	188.3830	160.8253	152.5902	133.9150	129.6500	136.8615	140.6288	161.0854	176.4809	200.9293
Energy content (annual)												
Distribution loss (46)m = 0.15 x (45)m												
30.5651	26.8949	28.2574	24.1238	22.8885	20.0873	19.4475	20.5292	21.0943	24.1628	26.4721	30.1394	30.1394
Water storage loss:												
Store volume												150.0000
a) If manufacturer declared loss factor is known (kWh/day):												1.3938
Temperature factor from Table 2b												0.5400
Enter (49) or (54) in (55)												0.7527
Total storage loss												
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325
If cylinder contains dedicated solar storage												
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325
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
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
Total heat required for water heating calculated for each month												
250.3623	221.3853	234.9779	205.9171	199.1851	179.0068	176.2449	183.4564	185.7207	207.6803	221.5728	247.5242	247.5242
WWHRS	-28.8298	-25.4973	-26.6993	-22.1081	-20.6040	-17.6310	-16.5262	-17.5740	-18.2417	-21.5049	-24.3625	-28.2959
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
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
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
Output from w/h												
221.5324	195.8880	208.2785	183.8090	178.5811	161.3759	159.7187	165.8824	167.4790	186.1754	197.2103	219.2283	219.2283
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
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000
Heat gains from water heating, kWh/month												
105.0286	93.2857	99.9133	89.5479	88.0122	80.6002	80.3846	82.7824	82.8326	90.8368	94.7534	104.0849	104.0849

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	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350	115.8350
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
105.2440	116.5201	105.2440	108.7521	105.2440	108.7521	105.2440	108.7521	105.2440	108.7521	105.2440	108.7521	105.2440
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
204.1952	206.3141	200.9745	189.6072	175.2580	161.7717	152.7621	150.6432	155.9828	167.3501	181.6993	195.1856	195.1856
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835	34.5835
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Losses e.g. evaporation (negative values) (Table 5)												
-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680	-92.6680
Water heating gains (Table 5)												
141.1674	138.8180	134.2920	124.3721	118.2959	111.9447	108.0438	111.2666	115.0452	122.0925	131.6019	139.8991	139.8991
Total internal gains												
511.3571	522.4027	501.2610	483.4818	459.5483	440.2191	423.8003	424.9043	437.5306	455.4371	482.8038	501.0791	501.0791

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Northeast	6.2000	11.2829	0.6300	0.7000	0.7700	21.3789
Southeast	2.1000	36.7938	0.6300	0.7000	0.7700	23.6138
Northwest	4.8000	11.2829	0.6300	0.7000	0.7700	16.5514
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089
Total gains	572.9012	639.8341	695.4008	780.1229	843.0097	843.4280

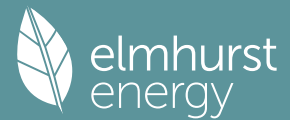
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843
Total gains	572.9012	639.8341	695.4008	780.1229	843.0097	843.4280	803.1647	736.0539	666.6232	594.2468	558.8139	552.2634

7. Mean internal temperature (heating season)

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

21.0000 (85)

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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	77.9889	78.2257	78.4592	79.5750	79.7873	80.7907	80.7907	80.9792	80.4012	79.7873	79.3590	78.9161
alpha	6.1993	6.2150	6.2306	6.3050	6.3192	6.3860	6.3860	6.3986	6.3601	6.3192	6.2906	6.2611
util living area	0.9967	0.9927	0.9809	0.9269	0.7826	0.5682	0.4146	0.4708	0.7441	0.9553	0.9920	0.9973 (86)
MIT	20.0550	20.2014	20.4253	20.7331	20.9303	20.9921	20.9991	20.9980	20.9619	20.7044	20.3364	20.0371 (87)
Th 2	20.0203	20.0230	20.0256	20.0380	20.0403	20.0511	20.0511	20.0531	20.0469	20.0403	20.0356	20.0307 (88)
util rest of house	0.9954	0.9899	0.9734	0.9004	0.7226	0.4875	0.3257	0.3751	0.6600	0.9330	0.9884	0.9963 (89)
MIT 2	18.9325	19.1206	19.4043	19.7832	19.9889	20.0474	20.0508	20.0525	20.0251	19.7602	19.3030	18.9176 (90)
Living area fraction	19.3784	19.5500	19.8099	20.1606	20.3629	20.4227	20.4275	20.4281	20.3973	20.1353	19.7135	19.3623 (91)
MIT	19.3784	19.5500	19.8099	20.1606	20.3629	20.4227	20.4275	20.4281	20.3973	20.1353	19.7135	19.3623 (92)
Temperature adjustment												0.0000
adjusted MIT	19.3784	19.5500	19.8099	20.1606	20.3629	20.4227	20.4275	20.4281	20.3973	20.1353	19.7135	19.3623 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9943	0.9881	0.9714	0.9042	0.7439	0.5195	0.3611	0.4132	0.6925	0.9357	0.9868	0.9953 (94)
Useful gains	569.6083	632.2168	675.4971	705.4022	627.0840	438.1738	289.9914	304.1379	461.6379	556.0239	551.4504	549.6876 (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	1184.5886	1147.4448	1039.3812	867.0162	665.2303	441.5774	290.2704	304.7721	479.8808	732.2255	973.8341	1177.1833 (97)
Space heating kWh	457.5454	346.2332	270.7298	116.3621	28.3808	0.0000	0.0000	0.0000	0.0000	131.0940	304.1163	466.8568 (98a)
Space heating requirement - total per year (kWh/year)												2121.3183
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	457.5454	346.2332	270.7298	116.3621	28.3808	0.0000	0.0000	0.0000	0.0000	131.0940	304.1163	466.8568 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2121.3183
Space heating per m2										(98c) / (4) =		29.0592 (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	457.5454	346.2332	270.7298	116.3621	28.3808	0.0000	0.0000	0.0000	0.0000	131.0940	304.1163	466.8568 (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)	495.7155	375.1172	293.3151	126.0694	30.7485	0.0000	0.0000	0.0000	0.0000	142.0303	329.4868	505.8037 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	221.5324	195.8880	208.2785	183.8090	178.5811	161.3759	159.7187	165.8824	167.4790	186.1754	197.2103	219.2283 (64)
Efficiency of water heater (217)m	85.6488	85.3229	84.6489	83.0635	80.9247	79.8000	79.8000	79.8000	79.8000	83.2879	85.0277	79.8000 (216)
Fuel for water heating, kWh/month	258.6522	229.5843	246.0499	221.2874	220.6756	202.2254	200.1488	207.8727	209.8735	223.5323	231.9366	255.7756 (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	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	21.8676	17.5430	15.7955	11.5725	8.9389	7.3032	8.1544	10.5994	13.7675	18.0638	20.4030	22.4754 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-34.2041	-48.2503	-69.4043	-78.1038	-84.2906	-78.7127	-77.7457	-73.3618	-65.6336	-55.2062	-37.6157	-29.5686 (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	-19.2391	-40.4829	-80.4789	-120.8953	-159.8705	-160.6299	-158.7337	-134.3882	-98.4917	-57.8954	-25.6883	-15.2126 (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												2298.2864 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2707.6143 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans:

Total electricity for the above, kWh/year

Electricity for lighting (calculated in Appendix L)

86.0000 (231)
176.4842 (232)

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

PV generation

-1804.1039 (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

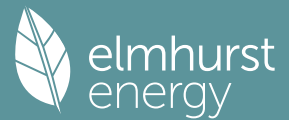
Energy saved or generated

-0.0000 (236)

Energy used

0.0000 (237)

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Total delivered energy for all uses

3464.2809 (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	2298.2864	0.2100	482.6401 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2707.6143	0.2100	568.5990 (264)
Space and water heating			1051.2391 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	176.4842	0.1443	25.4721 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-732.0975	0.1346	-98.5162
PV Unit electricity exported	-1072.0065	0.1259	-134.9569
Total			-233.4731 (269)
Total CO2, kg/year			855.1674 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.7100 (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	2298.2864	1.1300	2597.0636 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2707.6143	1.1300	3059.6042 (278)
Space and water heating			5656.6678 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	176.4842	1.5338	270.6973 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-732.0975	1.4973	-1096.1959
PV Unit electricity exported	-1072.0065	0.4621	-495.3846
Total			-1591.5805 (283)
Total Primary energy kWh/year			4465.8854 (286)
Target Primary Energy Rate (TPER)			61.1800 (287)

Energy Report



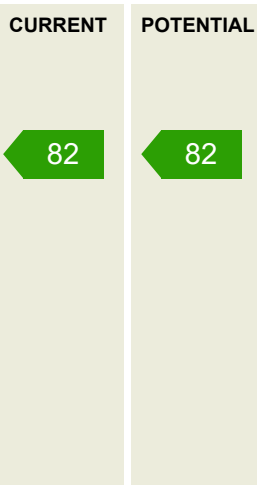
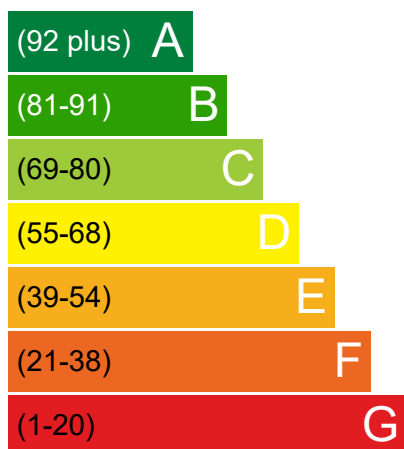
Dwelling Address	
Reference	Block C Flat 3-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	73

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

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

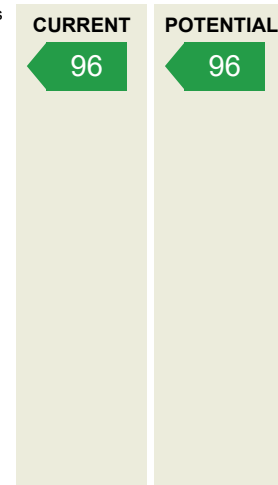
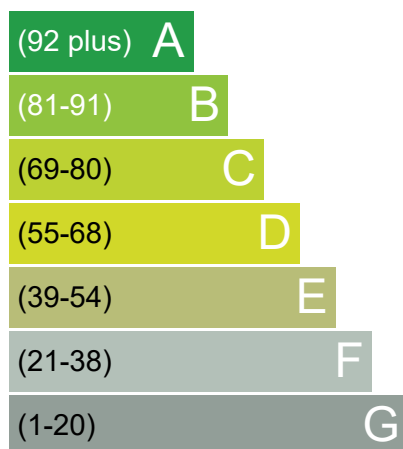
Energy Efficiency Rating

Most energy efficient - lower running costs

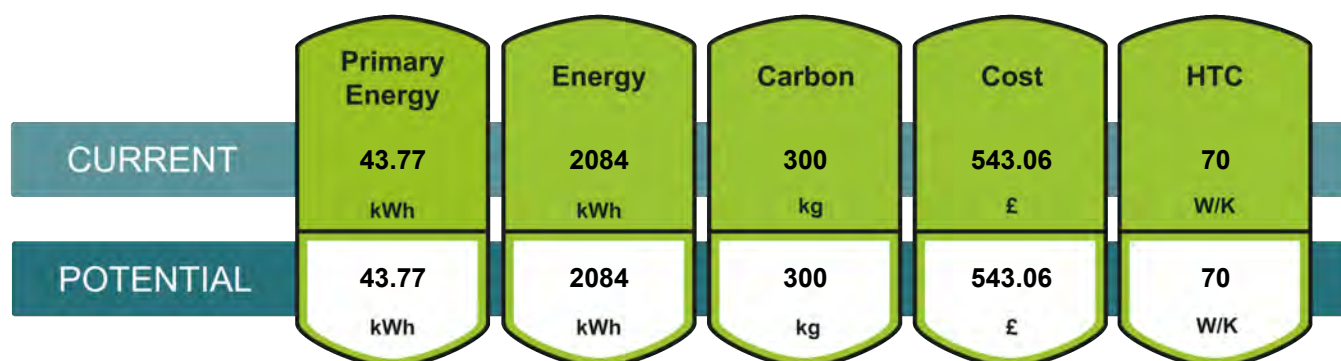


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£53	£53	
Heating		£119	£119	
Hot Water		£371	£371	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£543	£543	

Estimated energy use and potential savings



Space Heating

457

kWh per year



Water Heating

850

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

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Property Reference	Block C Flat 4				Issued on Date	15/04/2025	
Assessment Reference	Be Green			Prop Type Ref			
Property							
SAP Rating	84 B		DER	4.07		TER	9.57
Environmental	97 A		% DER < TER				57.47
CO ₂ Emissions (t/year)	0.27		DFEE	23.04		TFEE	25.40
Compliance Check	See BREL		% DFEE < TFEE				9.32
% DPER < TPER	12.56		DPER	43.42		TPER	49.65
Assessor Details	Mr. Joe Mountain					Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		
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	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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660	190.0000	6402.9997 (29a)
Total net area of external elements Aum(A, m ²)			46.8000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 23.4334		(33)
Main dwelling							
Party Floor 1			70.0000			30.0000	2100.0000 (32d)
Party Ceiling 1			70.0000			20.0000	1400.0000 (32b)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 9902.9997 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							141.4714 (35)
List of Thermal Bridges							
K1 Element							
E7 Party floor between dwellings (in blocks of flats)				Length	Psi-value	Total	
E14 Flat roof				28.0000	0.0000	0.0000	
E16 Corner (normal)				28.0000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				10.4000	0.0000	0.0000	
Point Thermal bridges							0.0000 (36)
Total fabric heat loss						(33) + (36) + (36a) =	23.4334 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 31.4408	Feb 31.3860	Mar 31.3323	Apr 31.0801	May 31.0329	Jun 30.8132	Jul 30.8132	Aug 30.7726	Sep 30.8979	Oct 31.0329	Nov 31.1284	Dec 31.2282	(38)
Heat transfer coeff	54.8742	54.8195	54.7658	54.5135	54.4664	54.2467	54.2467	54.2060	54.3313	54.4664	54.5618	54.6616	(39)
Average = Sum(39)m / 12 =												54.5133	

HLP	Jan 0.7839	Feb 0.7831	Mar 0.7824	Apr 0.7788	May 0.7781	Jun 0.7750	Jul 0.7750	Aug 0.7744	Sep 0.7762	Oct 0.7781	Nov 0.7795	Dec 0.7809	(40)
HLP (average)												0.7788	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461	(42)
Hot water usage for mixer showers														
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths														
26.1376	25.7430	25.1817	24.3411	23.5836	22.5407	21.7495	22.7170	23.2247	24.2581	25.3324	26.1169			(42b)
Hot water usage for other uses														
37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326			(42c)
Average daily hot water use (litres/day)													58.4472	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
63.7702	62.0071	60.0774	57.8683	55.7423	53.3310	52.5398	54.8757	56.7519	59.1537	61.5965	63.7494			(44)
Energy content (annual)	93.8807	82.0480	85.8493	75.5905	71.8296	61.6755	58.0580	64.5897	65.8294	76.2256	83.2498			(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =			912.4468	
14.0821	12.3072	12.8774	11.3386	10.7744	9.2513	8.7087	9.6885	9.8744	11.4338	12.4875	14.0431			(46)
Water storage loss:														
Store volume													150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8600	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													1.0044	(55)
Total storage loss														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364			(56)
If cylinder contains dedicated solar storage														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364			(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	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			(61)
Total heat required for water heating calculated for each month														
148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195			(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			(63d)
Output from w/h	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938			(64)
12Total per year (kWh/year)													1552.9488	(64)
Electric shower(s)													1553	(64a)
49.5554	44.1543	48.2148	46.0108	46.8741	44.7134	46.2038	46.8741	46.0108	48.2148	47.3081	49.5554			(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													563.6896	(64a)
Heat gains from water heating, kWh/month														
87.1232	77.6270	84.1176	78.7517	79.1209	73.8006	74.3743	76.7137	75.5062	80.9177	81.6228	87.0368			(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan 112.3062	Feb 112.3062	Mar 112.3062	Apr 112.3062	May 112.3062	Jun 112.3062	Jul 112.3062	Aug 112.3062	Sep 112.3062	Oct 112.3062	Nov 112.3062	Dec 112.3062	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(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)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Water heating gains (Table 5)	117.1011	115.5164	113.0613	109.3774	106.3453	102.5009	99.9654	103.1098	104.8697	108.7604	113.3650	116.9849	(72)
Total internal gains	472.1333	483.4221	464.9817	453.6826	433.4179	419.9110	405.3021	406.3991	416.6863	428.1923	450.0294	463.3119	(73)

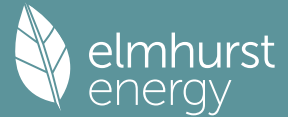
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	526.4051	586.9771	636.1808	715.2708	771.5672	775.4744	739.8386	680.7815	618.7081	550.5994	517.0577	508.4480	(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	50.1298	50.1799	50.2291	50.4615	50.5052	50.7097	50.7097	50.7478	50.6307	50.5052	50.4168	50.3248	
alpha	4.3420	4.3453	4.3486	4.3641	4.3670	4.3806	4.3806	4.3832	4.3754	4.3670	4.3611	4.3550	
util living area	0.9596	0.9358	0.8908	0.7792	0.6164	0.4403	0.3211	0.3634	0.5773	0.8250	0.9313	0.9645 (86)	

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Living	19.9328	20.1349	20.4097	20.7342	20.9196	20.9850	20.9970	20.9949	20.9540	20.7084	20.2806	19.8885
Non living	19.0206	19.2728	19.6110	19.9963	20.1988	20.2642	20.2735	20.2728	20.2375	19.9757	19.4602	18.9672
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	20.4540	20.1349	20.4097	20.7342	20.9196	20.9850	20.9970	20.9949	20.9540	20.7084	20.2806	20.0440 (87)
Th 2	20.2673	20.2680	20.2686	20.2718	20.2724	20.2751	20.2751	20.2756	20.2740	20.2724	20.2712	20.2699 (88)
util rest of house	0.9532	0.9262	0.8750	0.7512	0.5766	0.3928	0.2688	0.3074	0.5245	0.7953	0.9195	0.9589 (89)
MIT 2	19.7703	19.2728	19.6110	19.9963	20.1988	20.2642	20.2735	20.2728	20.2375	19.9757	19.4602	19.2019 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	20.0340	19.6053	19.9191	20.2809	20.4768	20.5422	20.5526	20.5513	20.5138	20.2583	19.7766	19.5267 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0340	19.6053	19.9191	20.2809	20.4768	20.5422	20.5526	20.5513	20.5138	20.2583	19.7766	19.5267 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9510	0.9161	0.8666	0.7516	0.5880	0.4104	0.2889	0.3288	0.5423	0.7947	0.9101	0.9520	(94)
Useful gains	500.5985	537.7452	551.3072	537.5744	453.6971	318.2841	213.7440	223.8475	335.5340	437.5401	470.5922	484.0557	(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	863.3921	806.1392	734.9066	620.4133	478.0419	322.3462	214.4153	225.0272	348.4722	526.0517	691.6584	837.7835	(97)
Space heating kWh	269.9184	180.3608	136.5980	59.6440	18.1125	0.0000	0.0000	0.0000	0.0000	65.8526	159.1676	263.1734	(98a)
Space heating requirement - total per year (kWh/year)												1152.8274	
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	269.9184	180.3608	136.5980	59.6440	18.1125	0.0000	0.0000	0.0000	0.0000	65.8526	159.1676	263.1734	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1152.8274	
Space heating per m2										(98c) / (4) =		16.4690	(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 %)													301.7506	(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	269.9184	180.3608	136.5980	59.6440	18.1125	0.0000	0.0000	0.0000	0.0000	65.8526	159.1676	263.1734	(98)	
Space heating efficiency (main heating system 1)	301.7506	301.7506	301.7506	301.7506	301.7506	0.0000	0.0000	0.0000	0.0000	301.7506	301.7506	301.7506	(210)	
Space heating fuel (main heating system)	89.4508	59.7715	45.2685	19.7660	6.0025	0.0000	0.0000	0.0000	0.0000	21.8235	52.7481	87.2155	(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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	(64)	
Efficiency of water heater	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	(216)	
Fuel for water heating, kWh/month	80.8173	71.4988	76.4399	69.8921	68.7987	62.3079	61.2927	64.8527	64.5720	71.1946	74.0666	80.6756	(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	23.9244	19.1931	17.2812	12.6610	9.7797	7.9901	8.9214	11.5963	15.0625	19.7628	22.3220	24.5894	(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													382.0464	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													183.4750	
Water heating fuel used													846.4090	(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)													193.0839	(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													1985.2290	(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	382.0464	0.1566	59.8380	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	846.4090	0.1404	118.8227	(264)
Energy for instantaneous electric shower(s)	563.6896	0.1391	78.4217	(264a)
Space and water heating			178.6607	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	193.0839	0.1443	27.8680	(268)
Total CO2, kg/year			284.9503	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.0700	(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	382.0464	1.5798	603.5627	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	846.4090	1.5191	1285.7497	(278)
Energy for instantaneous electric shower(s)	563.6896	1.5143	853.6145	(278a)
Space and water heating			1889.3123	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	193.0839	1.5338	296.1585	(282)
Total Primary energy kWh/year			3039.0853	(286)
Dwelling Primary energy Rate (DPER)			43.4200	(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				
Ground floor	70.0000	2.6000	182.0000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	182.0000	(5)

2. Ventilation rate

		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1099 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3599	(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) =	0.3059	(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	0.3900	0.3824	0.3747	0.3365	0.3288	0.2906	0.2906	0.2830	0.3059	0.3288	0.3441	0.3594	(22b)
Effective ac	0.5761	0.5731	0.5702	0.5566	0.5541	0.5422	0.5422	0.5400	0.5468	0.5541	0.5592	0.5646	(25)

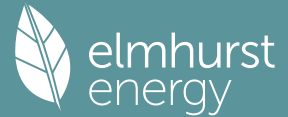
3. Heat losses and heat loss parameter

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 Opening Type			13.1000	1.1450	15.0000			(27)
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660			(29a)
Total net area of external elements Aum(A, m2)			46.8000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	21.0660			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							151.4714	(35)
List of Thermal Bridges								
K1 Element				Length	Psi-value		Total	
E7 Party floor between dwellings (in blocks of flats)				28.0000	0.0700		1.9600	

6. Solar gains												
[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d			Gains W
Northeast					6.2000	11.2829	0.6300	0.7000	0.7700			21.3789 (75)
Southeast					2.1000	36.7938	0.6300	0.7000	0.7700			23.6138 (77)
Northwest					4.8000	11.2829	0.6300	0.7000	0.7700			16.5514 (81)
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843 (83)
Total gains	559.0345	625.4899	681.7720	766.9243	830.5499	831.4030	791.6573	724.5575	654.7355	581.9828	545.7467	538.7249 (84)

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Temperature during heating periods in the living area from Table 9, Th1 (C)											21.0000 (85)	
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	48.4418	48.5836	48.7233	49.3906	49.5175	50.1169	50.1169	50.2295	49.8843	49.5175	49.2615	48.9967
alpha	4.2295	4.2389	4.2482	4.2927	4.3012	4.3411	4.3411	4.3486	4.3256	4.3012	4.2841	4.2664
util living area	0.9623	0.9397	0.8957	0.7855	0.6222	0.4444	0.3249	0.3691	0.5894	0.8352	0.9365	0.9668 (86)
MIT	19.8526	20.0661	20.3601	20.7124	20.9121	20.9838	20.9967	20.9944	20.9480	20.6799	20.2277	19.8214 (87)
Th 2	20.1943	20.1965	20.1986	20.2086	20.2105	20.2192	20.2192	20.2208	20.2158	20.2105	20.2067	20.2027 (88)
util rest of house	0.9558	0.9297	0.8790	0.7556	0.5790	0.3928	0.2680	0.3079	0.5318	0.8040	0.9244	0.9611 (89)
MIT 2	18.8619	19.1293	19.4921	19.9145	20.1319	20.2079	20.2176	20.2179	20.1758	19.8889	19.3422	18.8290 (90)
Living area fraction	19.2441	19.4907	19.8269	20.2223	20.4328	20.5072	20.5181	20.5174	fLA = Living area / (4) =	20.1940	19.6838	0.3857 (91)
MIT	19.2441	19.4907	19.8269	20.2223	20.4328	20.5072	20.5181	20.5174	20.4736	20.1940	19.6838	19.2117 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2441	19.4907	19.8269	20.2223	20.4328	20.5072	20.5181	20.5174	20.4736	20.1940	19.6838	19.2117 (93)

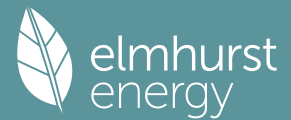
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9465	0.9195	0.8704	0.7561	0.5915	0.4120	0.2899	0.3313	0.5513	0.8033	0.9150	0.9522 (94)
Useful gains	529.1027	575.1270	593.3860	579.8805	491.2417	342.5468	229.4918	240.0724	360.9264	467.5044	499.3688	512.9864 (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	908.6030	884.5292	805.5972	675.1728	519.4247	347.1530	230.2597	241.4291	376.3140	570.6450	752.3663	902.3831 (97)
Space heating kWh	282.3483	207.9183	157.8851	68.6104	20.9682	0.0000	0.0000	0.0000	0.0000	76.7366	182.1581	289.7111 (98a)
Space heating requirement - total per year (kWh/year)												1286.3361
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	282.3483	207.9183	157.8851	68.6104	20.9682	0.0000	0.0000	0.0000	0.0000	76.7366	182.1581	289.7111 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1286.3361
Space heating per m2										(98c) / (4) =		18.3762 (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	282.3483	207.9183	157.8851	68.6104	20.9682	0.0000	0.0000	0.0000	0.0000	76.7366	182.1581	289.7111 (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)	305.9028	225.2636	171.0565	74.3341	22.7174	0.0000	0.0000	0.0000	0.0000	83.1383	197.3544	313.8799 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878 (64)
Efficiency of water heater (217)m	84.6383	84.2271	83.4786	82.0849	80.6699	79.8000	79.8000	79.8000	79.8000	82.2578	83.9147	79.8000 (216)
Fuel for water heating, kWh/month	257.8604	229.1437	245.8638	220.7536	218.3017	199.4903	197.4880	205.0668	206.9946	223.1464	231.6101	254.9458 (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	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	20.9948	16.8428	15.1651	11.1106	8.5821	7.0117	7.8289	10.1763	13.2180	17.3428	19.5886	21.5783 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-32.8701	-46.4063	-66.8089	-75.2540	-81.2811	-75.9327	-75.0050	-70.7452	-63.2427	-53.1331	-36.1640	-28.4114 (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	-18.3768	-38.6803	-76.9148	-115.5671	-152.8459	-153.5740	-151.7560	-128.4671	-94.1378	-55.3206	-24.5385	-14.5294 (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												1393.6469 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2690.6653 (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)												169.4401 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1729.9627 (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)

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Energy used	0.0000 (237)
Total delivered energy for all uses	2609.7896 (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	1393.6469	0.2100	292.6659 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2690.6653	0.2100	565.0397 (264)
Space and water heating			857.7056 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	169.4401	0.1443	24.4554 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	0.1345	-94.8895
PV Unit electricity exported	-1024.7084	0.1259	-128.9966
Total			-223.8861 (269)
Total CO2, kg/year			670.2042 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.5700 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1393.6469	1.1300	1574.8210 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2690.6653	1.1300	3040.4518 (278)
Space and water heating			4615.2728 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	169.4401	1.5338	259.8929 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	1.4973	-1055.9481
PV Unit electricity exported	-1024.7084	0.4621	-473.5061
Total			-1529.4542 (283)
Total Primary energy kWh/year			3475.8122 (286)
Target Primary Energy Rate (TPER)			49.6500 (287)

Energy Report



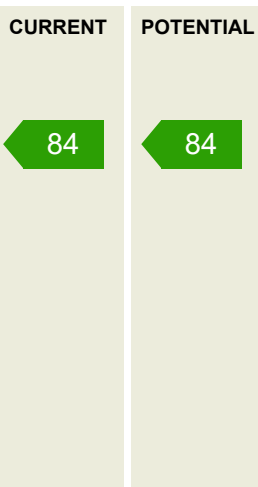
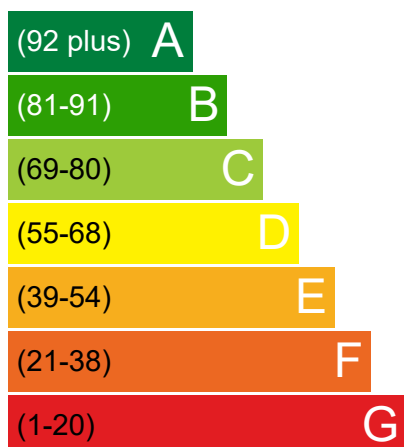
Dwelling Address	
Reference	Block C Flat 4-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

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

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

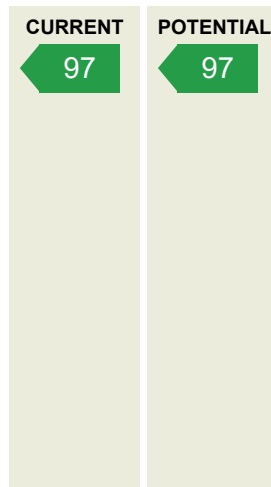
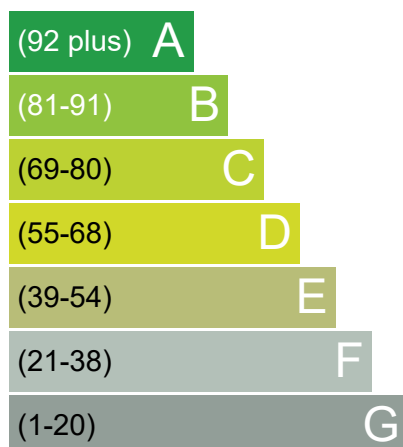
Energy Efficiency Rating

Most energy efficient - lower running costs

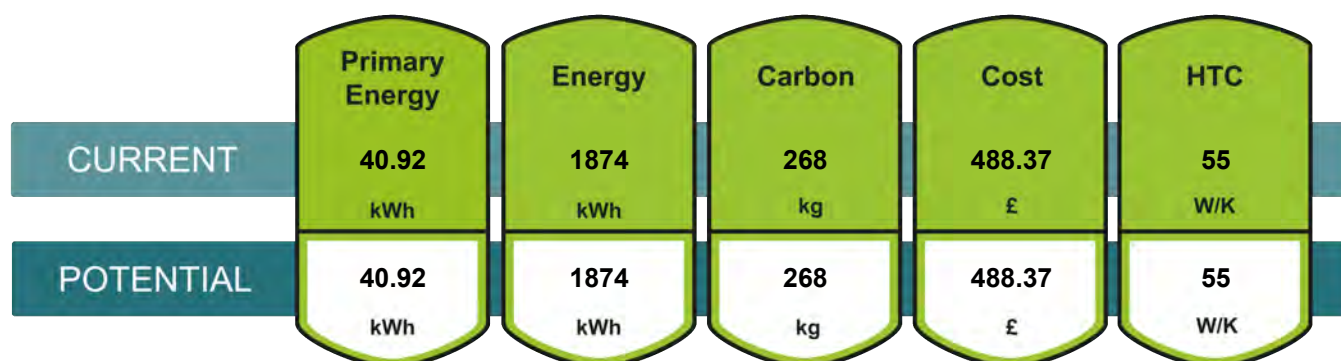


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£50	£50	
Heating		£70	£70	
Hot Water		£368	£368	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£488	£488	

Estimated energy use and potential savings



Space Heating
270
kWh per year



Water Heating
847
kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block C Flat 5			Issued on Date	15/04/2025
Assessment Reference	Be Green	Prop Type Ref			
Property					
SAP Rating	84 B	DER	4.07	TER	9.57
Environmental	97 A	% DER < TER			57.47
CO ₂ Emissions (t/year)	0.27	DFEE	23.04	TFEE	25.40
Compliance Check	See BREL	% DFEE < TFEE			9.32
% DPER < TPER	12.56	DPER	43.42	TPER	49.65
Assessor Details	Mr. Joe Mountain			Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		
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	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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660	190.0000	6402.9997 (29a)
Total net area of external elements Aum(A, m ²)			46.8000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	23.4334	(33)
Main dwelling							
Party Floor 1			70.0000			30.0000	2100.0000 (32d)
Party Ceiling 1			70.0000			20.0000	1400.0000 (32b)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		9902.9997 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							141.4714 (35)
List of Thermal Bridges							
K1 Element							
E7 Party floor between dwellings (in blocks of flats)				Length	Psi-value	Total	
E14 Flat roof				28.0000	0.0000	0.0000	
E16 Corner (normal)				28.0000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				10.4000	0.0000	0.0000	
Point Thermal bridges						(36a) =	0.0000 (36)
Total fabric heat loss						(33) + (36) + (36a) =	23.4334 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 31.4408	Feb 31.3860	Mar 31.3323	Apr 31.0801	May 31.0329	Jun 30.8132	Jul 30.8132	Aug 30.7726	Sep 30.8979	Oct 31.0329	Nov 31.1284	Dec 31.2282	(38)
Heat transfer coeff	54.8742	54.8195	54.7658	54.5135	54.4664	54.2467	54.2467	54.2060	54.3313	54.4664	54.5618	54.6616	(39)
Average = Sum(39)m / 12 =												54.5133	

HLP	Jan 0.7839	Feb 0.7831	Mar 0.7824	Apr 0.7788	May 0.7781	Jun 0.7750	Jul 0.7750	Aug 0.7744	Sep 0.7762	Oct 0.7781	Nov 0.7795	Dec 0.7809	(40)
HLP (average)												0.7788	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461	(42)
Hot water usage for mixer showers														
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)	
Hot water usage for baths														
26.1376	25.7430	25.1817	24.3411	23.5836	22.5407	21.7495	22.7170	23.2247	24.2581	25.3324	26.1169	(42b)		
Hot water usage for other uses														
37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326	(42c)		
Average daily hot water use (litres/day)												58.4472	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	63.7702	62.0071	60.0774	57.8683	55.7423	53.3310	52.5398	54.8757	56.7519	59.1537	61.5965	63.7494	(44)	
Energy content (annual)	93.8807	82.0480	85.8493	75.5905	71.8296	61.6755	58.0580	64.5897	65.8294	76.2256	83.2498	93.6207	(45)	
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		912.4468		
14.0821	12.3072	12.8774	11.3386	10.7744	9.2513	8.7087	9.6885	9.8744	11.4338	12.4875	14.0431	(46)		
Water storage loss:														
Store volume												150.0000	(47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.8600	(48)	
Temperature factor from Table 2b												0.5400	(49)	
Enter (49) or (54) in (55)												1.0044	(55)	
Total storage loss														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(56)		
If cylinder contains dedicated solar storage														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(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														
148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	(62)		
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)	
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)	
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)	
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)	
Output from w/h	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	(64)	
12Total per year (kWh/year)												1552.9488	(64)	
Electric shower(s)	49.5554	44.1543	48.2148	46.0108	46.8741	44.7134	46.2038	46.8741	46.0108	48.2148	47.3081	49.5554	(64a)	
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												563.6896	(64a)	
Heat gains from water heating, kWh/month	87.1232	77.6270	84.1176	78.7517	79.1209	73.8006	74.3743	76.7137	75.5062	80.9177	81.6228	87.0368	(65)	

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

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306 (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)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450 (71)
Water heating gains (Table 5)	117.1011	115.5164	113.0613	109.3774	106.3453	102.5009	99.9654	103.1098	104.8697	108.7604	113.3650	116.9849 (72)
Total internal gains	472.1333	483.4221	464.9817	453.6826	433.4179	419.9110	405.3021	406.3991	416.6863	428.1923	450.0294	463.3119 (73)

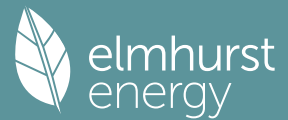
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	526.4051	586.9771	636.1808	715.2708	771.5672	775.4744	739.8386	680.7815	618.7081	550.5994	517.0577	508.4480	(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	50.1298	50.1799	50.2291	50.4615	50.5052	50.7097	50.7097	50.7478	50.6307	50.5052	50.4168	50.3248
alpha	4.3420	4.3453	4.3486	4.3641	4.3670	4.3806	4.3806	4.3832	4.3754	4.3670	4.3611	4.3550
util living area	0.9596	0.9358	0.8908	0.7792	0.6164	0.4403	0.3211	0.3634	0.5773	0.8250	0.9313	0.9645 (86)

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Living	19.9328	20.1349	20.4097	20.7342	20.9196	20.9850	20.9970	20.9949	20.9540	20.7084	20.2806	19.8885
Non living	19.0206	19.2728	19.6110	19.9963	20.1988	20.2642	20.2735	20.2728	20.2375	19.9757	19.4602	18.9672
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	20.4540	20.1349	20.4097	20.7342	20.9196	20.9850	20.9970	20.9949	20.9540	20.7084	20.2806	20.0440 (87)
Th 2	20.2673	20.2680	20.2686	20.2718	20.2724	20.2751	20.2751	20.2756	20.2740	20.2724	20.2712	20.2699 (88)
util rest of house	0.9532	0.9262	0.8750	0.7512	0.5766	0.3928	0.2688	0.3074	0.5245	0.7953	0.9195	0.9589 (89)
MIT 2	19.7703	19.2728	19.6110	19.9963	20.1988	20.2642	20.2735	20.2728	20.2375	19.9757	19.4602	19.2019 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	20.0340	19.6053	19.9191	20.2809	20.4768	20.5422	20.5526	20.5513	20.5138	20.2583	19.7766	19.5267 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0340	19.6053	19.9191	20.2809	20.4768	20.5422	20.5526	20.5513	20.5138	20.2583	19.7766	19.5267 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9510	0.9161	0.8666	0.7516	0.5880	0.4104	0.2889	0.3288	0.5423	0.7947	0.9101	0.9520	(94)
Useful gains	500.5985	537.7452	551.3072	537.5744	453.6971	318.2841	213.7440	223.8475	335.5340	437.5401	470.5922	484.0557	(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	863.3921	806.1392	734.9066	620.4133	478.0419	322.3462	214.4153	225.0272	348.4722	526.0517	691.6584	837.7835	(97)
Space heating kWh	269.9184	180.3608	136.5980	59.6440	18.1125	0.0000	0.0000	0.0000	0.0000	65.8526	159.1676	263.1734	(98a)
Space heating requirement - total per year (kWh/year)												1152.8274	
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	269.9184	180.3608	136.5980	59.6440	18.1125	0.0000	0.0000	0.0000	0.0000	65.8526	159.1676	263.1734	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1152.8274	
Space heating per m2										(98c) / (4) =		16.4690	(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 %)													301.7506 (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	269.9184	180.3608	136.5980	59.6440	18.1125	0.0000	0.0000	0.0000	0.0000	65.8526	159.1676	263.1734	(98)
Space heating efficiency (main heating system 1)	301.7506	301.7506	301.7506	301.7506	301.7506	0.0000	0.0000	0.0000	0.0000	301.7506	301.7506	301.7506	(210)
Space heating fuel (main heating system)	89.4508	59.7715	45.2685	19.7660	6.0025	0.0000	0.0000	0.0000	0.0000	21.8235	52.7481	87.2155	(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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	(64)
Efficiency of water heater	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	183.4750	(216)
Fuel for water heating, kWh/month	80.8173	71.4988	76.4399	69.8921	68.7987	62.3079	61.2927	64.8527	64.5720	71.1946	74.0666	80.6756	(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	23.9244	19.1931	17.2812	12.6610	9.7797	7.9901	8.9214	11.5963	15.0625	19.7628	22.3220	24.5894	(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												382.0464	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												183.4750	
Water heating fuel used												846.4090	(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)												193.0839	(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												1985.2290	(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	382.0464	0.1566	59.8380	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	846.4090	0.1404	118.8227	(264)
Energy for instantaneous electric shower(s)	563.6896	0.1391	78.4217	(264a)
Space and water heating			178.6607	(265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(267)
Energy for lighting	193.0839	0.1443	27.8680	(268)
Total CO2, kg/year			284.9503	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.0700	(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	382.0464	1.5798	603.5627	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	846.4090	1.5191	1285.7497	(278)
Energy for instantaneous electric shower(s)	563.6896	1.5143	853.6145	(278a)
Space and water heating			1889.3123	(279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000	(281)
Energy for lighting	193.0839	1.5338	296.1585	(282)
Total Primary energy kWh/year			3039.0853	(286)
Dwelling Primary energy Rate (DPER)			43.4200	(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				
Ground floor	70.0000	2.6000	182.0000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	182.0000	(5)

2. Ventilation rate

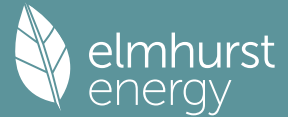
		m3 per hour	
Number of open chimneys	0 * 80 =	0.0000	(6a)
Number of open flues	0 * 20 =	0.0000	(6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000	(6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000	(6d)
Number of flues attached to other heater	0 * 35 =	0.0000	(6e)
Number of blocked chimneys	0 * 20 =	0.0000	(6f)
Number of intermittent extract fans	2 * 10 =	20.0000	(7a)
Number of passive vents	0 * 10 =	0.0000	(7b)
Number of flueless gas fires	0 * 40 =	0.0000	(7c)
Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1099 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3599	(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) =	0.3059	(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	0.3900	0.3824	0.3747	0.3365	0.3288	0.2906	0.2906	0.2830	0.3059	0.3288	0.3441	0.3594	(22b)
Effective ac	0.5761	0.5731	0.5702	0.5566	0.5541	0.5422	0.5422	0.5400	0.5468	0.5541	0.5592	0.5646	(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 Opening Type			13.1000	1.1450	15.0000			(27)
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660			(29a)
Total net area of external elements Aum(A, m2)			46.8000					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	21.0660			(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							151.4714	(35)
List of Thermal Bridges								
K1 Element				Length	Psi-value	Total		
E7 Party floor between dwellings (in blocks of flats)				28.0000	0.0700	1.9600		

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E14 Flat roof													
E16 Corner (normal)													
Thermal bridges (Sum(L x Psi) calculated using Appendix K)													
Point Thermal bridges													
Total fabric heat loss													
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	34.5983	34.4209	34.2470	33.4303	33.2775	32.5662	32.5662	32.4345	32.8402	33.2775	33.5866	33.9098	(38)
Average = Sum(39)m / 12 =	60.8003	60.6229	60.4490	59.6323	59.4795	58.7682	58.7682	58.6365	59.0422	59.4795	59.7886	60.1118	(39)
												59.6316	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.8686	0.8660	0.8636	0.8519	0.8497	0.8395	0.8395	0.8377	0.8435	0.8497	0.8541	0.8587	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461 (42)
Hot water usage for mixer showers													
Hot water usage for baths	61.8798	60.9498	59.5947	57.0020	55.0887	52.9549	51.7420	53.0869	54.5611	56.8521	59.5005	61.6427	(42a)
Hot water usage for other uses	26.7336	26.3365	25.7774	24.7465	23.9746	23.1187	22.6564	23.2116	23.8161	24.7319	25.7840	26.6432	(42b)
Average daily hot water use (litres/day)	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326	(42c)
												116.0487	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	126.2459	123.5505	120.2678	115.2758	111.2220	106.8639	105.1887	108.4572	111.9043	116.4797	121.5487	125.9184	(44)
Energy content (annual)	199.9426	175.9342	184.8472	157.8067	149.7262	131.4016	127.2166	134.2926	137.9892	158.0618	173.1684	197.1578	(45)
Distribution loss (46)m = 0.15 x (45)m													
Water storage loss:	29.9914	26.3901	27.7271	23.6710	22.4589	19.7102	19.0825	20.1439	20.6984	23.7093	25.9753	29.5737	(46)
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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	246.5375	218.0199	231.4421	202.8986	196.3211	176.4934	173.8115	180.8875	183.0811	204.6567	218.2602	243.7527	(62)
WWHRS	-28.2888	-25.0189	-26.1983	-21.6933	-20.2173	-17.3001	-16.2161	-17.2442	-17.8994	-21.1014	-23.9053	-27.7650	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878	(64)
12Total per year (kWh/year)													2213.3143 (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	103.7568	92.1667	98.7376	88.5442	87.0599	79.7645	79.5754	81.9282	81.9549	89.8315	93.6520	102.8309	(65)

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

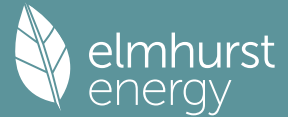
Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	(68)
Pumps, fans	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Total internal gains	139.4581	137.1528	132.7118	122.9781	117.0160	110.7840	106.9562	110.1186	113.8262	120.7412	130.0722	138.2136	(72)
	497.4904	508.0585	487.6322	470.2832	447.0886	428.1941	412.2929	413.4079	425.6429	443.1731	469.7366	487.5406	(73)

6. Solar gains

[Jan]													
		Area		Solar flux		g		FF		Access		Gains	
		m2		Table 6a		Specific data		Specific data		factor		W	
				W/m2		or Table 6b		or Table 6c		Table 6d			
Northeast		6.2000		11.2829		0.6300		0.7000		0.7700		21.3789	(75)
Southeast		2.1000		36.7938		0.6300		0.7000		0.7700		23.6138	(77)
Northwest		4.8000		11.2829		0.6300		0.7000		0.7700		16.5514	(81)
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843	(83)
Total gains	559.0345	625.4899	681.7720	766.9243	830.5499	831.4030	791.6573	724.5575	654.7355	581.9828	545.7467	538.7249	(84)

7. Mean internal temperature (heating season)

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Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	48.4418	48.5836	48.7233	49.3906	49.5175	50.1169	50.1169	50.2295	49.8843	49.5175	49.2615	48.9967
alpha	4.2295	4.2389	4.2482	4.2927	4.3012	4.3411	4.3411	4.3486	4.3256	4.3012	4.2841	4.2664
util living area	0.9623	0.9397	0.8957	0.7855	0.6222	0.4444	0.3249	0.3691	0.5894	0.8352	0.9365	0.9668 (86)
MIT	19.8526	20.0661	20.3601	20.7124	20.9121	20.9838	20.9967	20.9944	20.9480	20.6799	20.2277	19.8214 (87)
Th 2	20.1943	20.1965	20.1986	20.2086	20.2105	20.2192	20.2192	20.2208	20.2158	20.2105	20.2067	20.2027 (88)
util rest of house	0.9558	0.9297	0.8790	0.7556	0.5790	0.3928	0.2680	0.3079	0.5318	0.8040	0.9244	0.9611 (89)
MIT 2	18.8619	19.1293	19.4921	19.9145	20.1319	20.2079	20.2176	20.2179	20.1758	19.8889	19.3422	18.8290 (90)
Living area fraction	19.2441	19.4907	19.8269	20.2223	20.4328	20.5072	20.5181	20.5174	20.4736	20.1940	19.6838	19.2117 (92)
MIT	19.2441	19.4907	19.8269	20.2223	20.4328	20.5072	20.5181	20.5174	20.4736	20.1940	19.6838	19.2117 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2441	19.4907	19.8269	20.2223	20.4328	20.5072	20.5181	20.5174	20.4736	20.1940	19.6838	19.2117 (93)

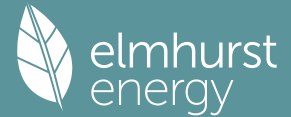
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9465	0.9195	0.8704	0.7561	0.5915	0.4120	0.2899	0.3313	0.5513	0.8033	0.9150	0.9522 (94)
Useful gains	529.1027	575.1270	593.3860	579.8805	491.2417	342.5468	229.4918	240.0724	360.9264	467.5044	499.3688	512.9864 (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	908.6030	884.5292	805.5972	675.1728	519.4247	347.1530	230.2597	241.4291	376.3140	570.6450	752.3663	902.3831 (97)
Space heating kWh	282.3483	207.9183	157.8851	68.6104	20.9682	0.0000	0.0000	0.0000	0.0000	76.7366	182.1581	289.7111 (98a)
Space heating requirement - total per year (kWh/year)												1286.3361
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	282.3483	207.9183	157.8851	68.6104	20.9682	0.0000	0.0000	0.0000	0.0000	76.7366	182.1581	289.7111 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1286.3361
Space heating per m2										(98c) / (4) =		18.3762 (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	282.3483	207.9183	157.8851	68.6104	20.9682	0.0000	0.0000	0.0000	0.0000	76.7366	182.1581	289.7111 (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)	305.9028	225.2636	171.0565	74.3341	22.7174	0.0000	0.0000	0.0000	0.0000	83.1383	197.3544	313.8799 (211)	
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)	
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)	
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)	
Water heating													
Water heating requirement	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878 (64)	
Efficiency of water heater (217)m	84.6383	84.2271	83.4786	82.0849	80.6699	79.8000	79.8000	79.8000	79.8000	82.2578	83.9147	79.8000 (216)	
Fuel for water heating, kWh/month	257.8604	229.1437	245.8638	220.7536	218.3017	199.4903	197.4880	205.0668	206.9946	223.1464	231.6101	254.9458 (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	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	20.9948	16.8428	15.1651	11.1106	8.5821	7.0117	7.8289	10.1763	13.2180	17.3428	19.5886	21.5783 (232)	
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-32.8701	-46.4063	-66.8089	-75.2540	-81.2811	-75.9327	-75.0050	-70.7452	-63.2427	-53.1331	-36.1640	-28.4114 (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	-18.3768	-38.6803	-76.9148	-115.5671	-152.8459	-153.5740	-151.7560	-128.4671	-94.1378	-55.3206	-24.5385	-14.5294 (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													1393.6469 (211)
Space heating fuel - main system 2													0.0000 (213)
Space heating fuel - secondary													0.0000 (215)
Efficiency of water heater													79.8000
Water heating fuel used													2690.6653 (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)													169.4401 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation													-1729.9627 (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)

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Energy used	0.0000 (237)
Total delivered energy for all uses	2609.7896 (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	1393.6469	0.2100	292.6659 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2690.6653	0.2100	565.0397 (264)
Space and water heating			857.7056 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	169.4401	0.1443	24.4554 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	0.1345	-94.8895
PV Unit electricity exported	-1024.7084	0.1259	-128.9966
Total			-223.8861 (269)
Total CO2, kg/year			670.2042 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.5700 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1393.6469	1.1300	1574.8210 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2690.6653	1.1300	3040.4518 (278)
Space and water heating			4615.2728 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	169.4401	1.5338	259.8929 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	1.4973	-1055.9481
PV Unit electricity exported	-1024.7084	0.4621	-473.5061
Total			-1529.4542 (283)
Total Primary energy kWh/year			3475.8122 (286)
Target Primary Energy Rate (TPER)			49.6500 (287)

Energy Report



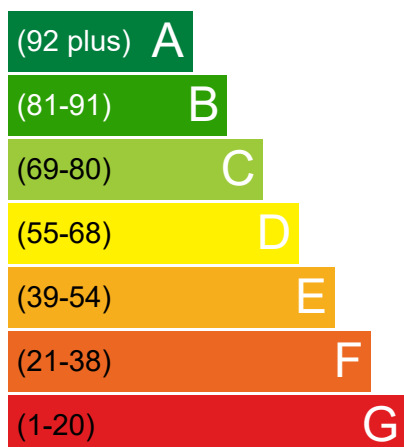
Dwelling Address	
Reference	Block C Flat 5-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

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

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

Energy Efficiency Rating

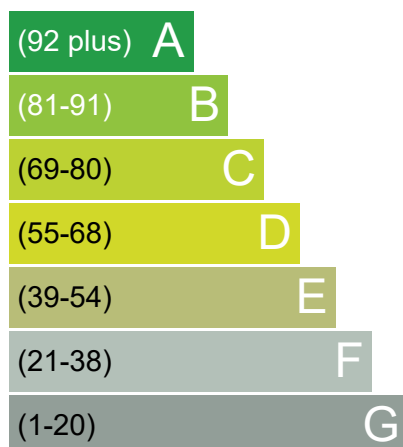
Most energy efficient - lower running costs



CURRENT	POTENTIAL
84	84

Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



CURRENT	POTENTIAL
97	97

Additional ratings for your home

	Primary Energy	Energy	Carbon	Cost	HTC
CURRENT	40.92 kWh	1874 kWh	268 kg	488.37 £	55 W/K
POTENTIAL	40.92 kWh	1874 kWh	268 kg	488.37 £	55 W/K

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£50	£50	
Heating		£70	£70	
Hot Water		£368	£368	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£488	£488	

Estimated energy use and potential savings



Space Heating

270

kWh per year



Water Heating

847

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

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Property Reference	Block C Flat 6				Issued on Date	15/04/2025	
Assessment Reference	Be Green		Prop Type Ref				
Property							
SAP Rating	84 B		DER	3.65	TER	8.42	
Environmental	97 A		% DER < TER			56.65	
CO ₂ Emissions (t/year)	0.31		DFEE	23.43	TFEE	25.45	
Compliance Check	See BREL		% DFEE < TFEE			7.92	
% DPER < TPER	10.91		DPER	38.79	TPER	43.54	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001	
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	90.0000 (1b)	2.6000 (2b)	234.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.0000		234.0000 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	234.0000 (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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	75.4000	13.1000	62.3000	0.1800	11.2140	190.0000	11836.9995 (29a)
Total net area of external elements Aum(A, m ²)			75.4000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	28.5814		(33)
Main dwelling							
Party Floor 1			90.0000			30.0000	2700.0000 (32d)
Party Ceiling 1			90.0000			20.0000	1800.0000 (32b)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16336.9995 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							181.5222 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E7 Party floor between dwellings (in blocks of flats)					28.0000	0.0000	0.0000
E14 Flat roof					28.0000	0.0000	0.0000
E16 Corner (normal)					10.4000	0.0000	0.0000
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	28.5814 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 40.4239	Feb 40.3535	Mar 40.2844	Apr 39.9602	May 39.8995	Jun 39.6170	Jul 39.6170	Aug 39.5647	Sep 39.7258	Oct 39.8995	Nov 40.0222	Dec 40.1505	(38)
Heat transfer coeff	69.0053	68.9349	68.8659	68.5416	68.4809	68.1985	68.1985	68.1462	68.3073	68.4809	68.6036	68.7320	(39)
Average = Sum(39)m / 12 =												68.5413	

HLP	Jan 0.7667	Feb 0.7659	Mar 0.7652	Apr 0.7616	May 0.7609	Jun 0.7578	Jul 0.7578	Aug 0.7572	Sep 0.7590	Oct 0.7609	Nov 0.7623	Dec 0.7637	(40)
HLP (average)												0.7616	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6257	(42)
Hot water usage for mixer showers														
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)	
Hot water usage for baths														
28.8136	28.3786	27.7599	26.8332	25.9981	24.8484	23.9763	25.0428	25.6025	26.7416	27.9260	28.7907	(42b)		
Hot water usage for other uses														
41.5200	40.0102	38.5004	36.9905	35.4807	33.9709	33.9709	35.4807	36.9905	38.5004	40.0102	41.5200	(42c)		
Average daily hot water use (litres/day)													64.4625	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
70.3336	68.3888	66.2602	63.8238	61.4788	58.8194	57.9472	60.5235	62.5931	65.2420	67.9362	70.3107	(44)		
Energy content (annual)	103.5432	90.4923	94.6845	83.3698	79.2217	68.0226	64.0333	71.2373	72.6048	84.0709	91.8180	103.2565	(45)	
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1006.3550		
15.5315	13.5738	14.2027	12.5055	11.8833	10.2034	9.6050	10.6856	10.8907	12.6106	13.7727	15.4885	(46)		
Water storage loss:														
Store volume												150.0000	(47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.8600	(48)	
Temperature factor from Table 2b												0.5400	(49)	
Enter (49) or (54) in (55)												1.0044	(55)	
Total storage loss														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(56)		
If cylinder contains dedicated solar storage														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(57)		
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	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	(61)		
Total heat required for water heating calculated for each month														
157.9420	139.6267	149.0833	136.0138	133.6205	120.6666	118.4321	125.6361	125.2488	138.4697	144.4620	157.6553	(62)		
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)		
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)		
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)		
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)		
Output from w/h														
157.9420	139.6267	149.0833	136.0138	133.6205	120.6666	118.4321	125.6361	125.2488	138.4697	144.4620	157.6553	(64)		
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		1646.8570	(64)	
Electric shower(s)												1647	(64)	
54.6524	48.6958	53.1739	50.7432	51.6954	49.3124	50.9561	51.6954	50.7432	53.1739	52.1740	54.6524	(64a)		
Heat gains from water heating, kWh/month														
91.6103	81.5701	88.2951	82.5215	82.7841	77.0608	77.5492	80.1293	78.9421	84.7661	85.6882	91.5149	(65)		

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

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	128.2865	142.0315	128.2865	132.5627	128.2865	132.5627	128.2865	128.2865	132.5627	128.2865	132.5627	128.2865	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	239.0777	241.5586	235.3069	221.9977	205.1972	189.4071	178.8584	176.3775	182.6292	195.9384	212.7389	228.5290	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	(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)	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	(71)
Water heating gains (Table 5)	123.1321	121.3841	118.6762	114.6131	111.2689	107.0289	104.2327	107.7007	109.6418	113.9329	119.0114	123.0039	(72)
Total internal gains	552.8821	567.3601	544.6554	531.5594	507.1385	491.3846	473.7634	474.7505	487.2196	500.5437	526.6988	542.2053	(73)

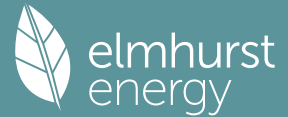
6. Solar gains

[Jan]												
			Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast			6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast			2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest			4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	607.1539	670.9151	715.8545	793.1476	845.2878	846.9480	808.2999	749.1328	689.2413	622.9509	593.7271	587.3414 (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	65.7638	65.8310	65.8970	66.2088	66.2675	66.5419	66.5419	66.5930	66.4359	66.2675	66.1489	66.0254	
alpha	5.3843	5.3887	5.3931	5.4139	5.4178	5.4361	5.4361	5.4395	5.4291	5.4178	5.4099	5.4017	
util living area													
	0.9847	0.9726	0.9466	0.8623	0.7056	0.5084	0.3702	0.4163	0.6537	0.8948	0.9695	0.9871	(86)

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Living	20.0745	20.2366	20.4642	20.7570	20.9324	20.9902	20.9986	20.9973	20.9653	20.7413	20.3684	20.0397
Non living	19.1966	19.4013	19.6851	20.0371	20.2278	20.2836	20.2894	20.2893	20.2632	20.0262	19.5715	19.1545
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	20.5266	20.2366	20.4642	20.7570	20.9324	20.9902	20.9986	20.9973	20.9653	20.7413	20.3684	20.1740 (87)
Th 2	20.2823	20.2829	20.2836	20.2868	20.2873	20.2901	20.2901	20.2906	20.2890	20.2873	20.2862	20.2849 (88)
util rest of house	0.9815	0.9671	0.9357	0.8372	0.6629	0.4546	0.3110	0.3531	0.5959	0.8695	0.9622	0.9843 (89)
MIT 2	19.8495	19.4013	19.6851	20.0371	20.2278	20.2836	20.2894	20.2893	20.2632	20.0262	19.5715	19.3582 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	19.9849	19.5683	19.8409	20.1810	20.3687	20.4249	20.4313	20.4309	20.4037	20.1692	19.7309	19.5214 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9849	19.5683	19.8409	20.1810	20.3687	20.4249	20.4313	20.4309	20.4037	20.1692	19.7309	19.5214 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9800	0.9602	0.9279	0.8332	0.6679	0.4649	0.3228	0.3657	0.6056	0.8647	0.9553	0.9807	(94)
Useful gains	594.9927	644.2204	664.2229	660.8129	564.5855	393.7808	260.9043	273.9476	417.3777	538.6892	567.2014	575.9822	(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	1082.3402	1011.1609	918.7329	773.2206	593.6414	397.2489	261.2859	274.6907	430.5850	655.3074	866.5256	1053.0690	(97)
Space heating kWh	362.5865	246.5841	189.3554	80.9336	21.6176	0.0000	0.0000	0.0000	0.0000	86.7639	215.5134	354.9525	(98a)
Space heating requirement - total per year (kWh/year)												1558.3070	
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	362.5865	246.5841	189.3554	80.9336	21.6176	0.0000	0.0000	0.0000	0.0000	86.7639	215.5134	354.9525	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1558.3070	
Space heating per m2										(98c) / (4) =		17.3145	(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 %)													306.0407	(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	362.5865	246.5841	189.3554	80.9336	21.6176	0.0000	0.0000	0.0000	0.0000	86.7639	215.5134	354.9525	(98)	
Space heating efficiency (main heating system 1)	306.0407	306.0407	306.0407	306.0407	306.0407	0.0000	0.0000	0.0000	0.0000	306.0407	306.0407	306.0407	(210)	
Space heating fuel (main heating system)	118.4766	80.5723	61.8726	26.4454	7.0636	0.0000	0.0000	0.0000	0.0000	28.3505	70.4199	115.9821	(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	157.9420	139.6267	149.0833	136.0138	133.6205	120.6666	118.4321	125.6361	125.2488	138.4697	144.4620	157.6553	(64)	
Efficiency of water heater													184.9898	(216)
(217)m	184.9898	184.9898	184.9898	184.9898	184.9898	184.9898	184.9898	184.9898	184.9898	184.9898	184.9898	184.9898	(217)	
Fuel for water heating, kWh/month	85.3788	75.4780	80.5900	73.5250	72.2313	65.2288	64.0209	67.9151	67.7058	74.8526	78.0919	85.2238	(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	31.7135	25.4418	22.9075	16.7830	12.9637	10.5914	11.8259	15.3718	19.9664	26.1970	29.5894	32.5949	(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													509.1830	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													184.9898	
Water heating fuel used													890.2419	(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)													255.9463	(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													2277.0394	(238)

Full SAP Calculation Printout



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	509.1830	0.1567	79.7780 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	890.2419	0.1405	125.0358 (264)
Energy for instantaneous electric shower(s)	621.6683	0.1391	86.4878 (264a)
Space and water heating			204.8138 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	255.9463	0.1443	36.9410 (268)
Total CO2, kg/year			328.2425 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.6500 (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	509.1830	1.5800	804.5211 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	890.2419	1.5193	1352.5578 (278)
Energy for instantaneous electric shower(s)	621.6683	1.5143	941.4135 (278a)
Space and water heating			2157.0790 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	255.9463	1.5338	392.5789 (282)
Total Primary energy kWh/year			3491.0714 (286)
Dwelling Primary energy Rate (DPER)			38.7900 (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	90.0000 (1b)	x 2.6000 (2b)	= 234.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	234.0000 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1282 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3782 (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) = 0.3215 (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	0.4099	0.4018	0.3938	0.3536	0.3456	0.3054	0.3054	0.2974	0.3215	0.3456	0.3617	0.3777 (22b)
Effective ac	0.5840	0.5807	0.5775	0.5625	0.5597	0.5466	0.5466	0.5442	0.5517	0.5597	0.5654	0.5713 (25)

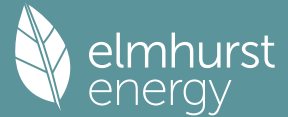
3. Heat losses and heat loss parameter

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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	75.4000	13.1000	62.3000	0.1800	11.2140		(29a)
Total net area of external elements Aum(A, m2)			75.4000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		26.2140		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							191.5222 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E7 Party floor between dwellings (in blocks of flats)				28.0000	0.0700	1.9600	

6. Solar gains													
[Jan]		Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
Northeast		6.2000	11.2829	0.6300	0.7000	0.7700	21.3789 (75)						
Southeast		2.1000	36.7938	0.6300	0.7000	0.7700	23.6138 (77)						
Northwest		4.8000	11.2829	0.6300	0.7000	0.7700	16.5514 (81)						
Solar gains		61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843 (83)
Total gains		642.9460	712.5164	764.3300	847.0631	906.2311	904.5916	861.7007	794.4928	727.0531	656.4297	624.9976	620.6648 (84)

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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	62.6327	62.8398	63.0441	64.0216	64.2079	65.0895	65.0895	65.2554	64.7470	64.2079	63.8322	63.4441	
alpha	5.1755	5.1893	5.2029	5.2681	5.2805	5.3393	5.3393	5.3504	5.3165	5.2805	5.2555	5.2296	
util living area	0.9855	0.9741	0.9489	0.8669	0.7115	0.5127	0.3744	0.4223	0.6662	0.9019	0.9716	0.9877 (86)	
MIT	19.9927	20.1650	20.4103	20.7315	20.9233	20.9889	20.9983	20.9968	20.9591	20.7111	20.3154	19.9715 (87)	
Th 2	20.2107	20.2131	20.2155	20.2266	20.2286	20.2383	20.2383	20.2401	20.2346	20.2286	20.2244	20.2201 (88)	
util rest of house	0.9823	0.9684	0.9377	0.8405	0.6656	0.4546	0.3102	0.3538	0.6038	0.8760	0.9644	0.9849 (89)	
MIT 2	19.0352	19.2541	19.5614	19.9537	20.1624	20.2312	20.2376	20.2387	20.2050	19.9397	19.4542	19.0154 (90)	
Living area fraction	19.2267	19.4363	19.7312	20.1092	20.3146	20.3827	20.3897	20.3903	fLA = Living area / (4) =				0.2000 (91)
MIT	19.2267	19.4363	19.7312	20.1092	20.3146	20.3827	20.3897	20.3903	20.3558	20.0940	19.6264	19.2066 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.2267	19.4363	19.7312	20.1092	20.3146	20.3827	20.3897	20.3903	20.3558	20.0940	19.6264	19.2066 (93)	

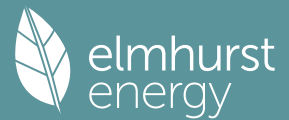
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9769	0.9613	0.9294	0.8361	0.6710	0.4658	0.3230	0.3674	0.6141	0.8708	0.9574	0.9801 (94)
Useful gains	628.1039	684.9621	710.3830	708.2035	608.0474	421.3396	278.3212	291.8983	446.4793	571.6014	598.3648	608.2941 (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	1141.0965	1107.5855	1004.8785	838.3184	642.4004	425.3851	278.7773	292.7856	462.6171	707.9778	939.6078	1132.5320 (97)
Space heating kWh	381.6665	284.0029	219.1046	93.6827	25.5587	0.0000	0.0000	0.0000	0.0000	101.4640	245.6949	390.0330 (98a)
Space heating requirement - total per year (kWh/year)												1741.2074
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	381.6665	284.0029	219.1046	93.6827	25.5587	0.0000	0.0000	0.0000	0.0000	101.4640	245.6949	390.0330 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1741.2074
Space heating per m2										(98c) / (4) =		19.3467 (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	381.6665	284.0029	219.1046	93.6827	25.5587	0.0000	0.0000	0.0000	0.0000	101.4640	245.6949	390.0330 (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)	413.5065	307.6955	237.3831	101.4981	27.6909	0.0000	0.0000	0.0000	0.0000	109.9285	266.1917	422.5710 (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	235.9106	208.5287	221.5667	195.2097	189.4284	170.9326	169.0160	175.6865	177.5380	197.6476	209.7130	233.4172 (64)	
Efficiency of water heater (217)m	85.1323	84.7531	84.0347	82.5119	80.7732	79.8000	79.8000	79.8000	79.8000	82.6412	84.4158	79.8000 (216)	
Fuel for water heating, kWh/month	277.1105	246.0427	263.6609	236.5837	234.5187	214.2013	211.7995	220.1585	222.4788	239.1635	248.4285	85.2023 (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	26.6554	21.3840	19.2539	14.1062	10.8960	8.9022	9.9397	12.9200	16.7819	22.0187	24.8701	27.3962 (232)	
Electricity generated by PVs (Appendix M) (negative quantity)	-41.5956	-58.3772	-83.5262	-93.4529	-100.3642	-93.5101	-92.3352	-87.3626	-78.5327	-66.5253	-45.6287	-35.9914 (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)	-24.2933	-51.0198	-101.2614	-151.8885	-200.6563	-201.5699	-199.2147	-168.7675	-123.8136	-72.9151	-32.4173	-19.2182 (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													1886.4652 (211)
Space heating fuel - main system 2													0.0000 (213)
Space heating fuel - secondary													0.0000 (215)
Efficiency of water heater													79.8000
Water heating fuel used													2888.1029 (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)													215.1244 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation													-2224.2377 (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)

Full SAP Calculation Printout



Energy used	0.0000 (237)
Total delivered energy for all uses	2851.4547 (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	1886.4652	0.2100	396.1577 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2888.1029	0.2100	606.5016 (264)
Space and water heating			1002.6593 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	215.1244	0.1443	31.0491 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-877.2021	0.1347	-118.1518
PV Unit electricity exported	-1347.0357	0.1259	-169.6354
Total			-287.7872 (269)
Total CO2, kg/year			757.8504 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			8.4200 (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	1886.4652	1.1300	2131.7057 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2888.1029	1.1300	3263.5562 (278)
Space and water heating			5395.2619 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	215.1244	1.5338	329.9649 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-877.2021	1.4978	-1313.8762
PV Unit electricity exported	-1347.0357	0.4623	-622.6807
Total			-1936.5569 (283)
Total Primary energy kWh/year			3918.7708 (286)
Target Primary Energy Rate (TPER)			43.5400 (287)

Energy Report



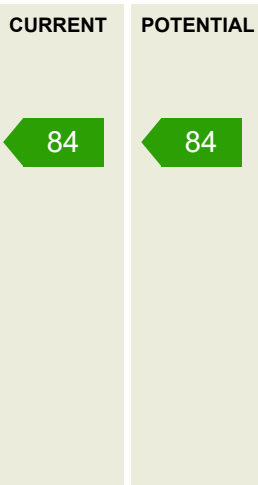
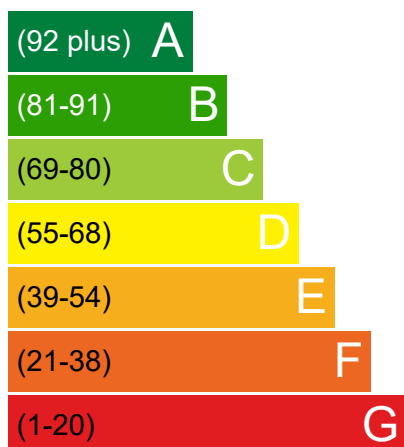
Dwelling Address	
Reference	Block C Flat 6-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	90

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

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

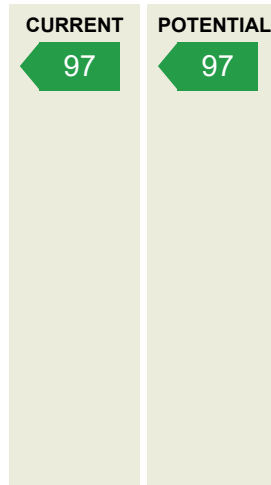
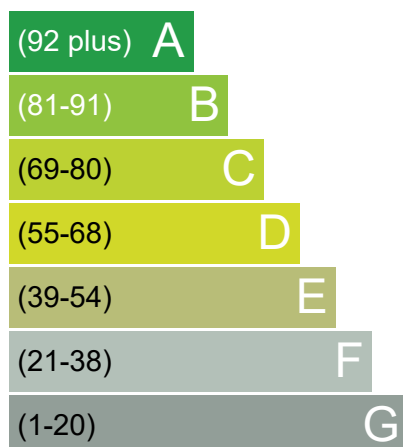
Energy Efficiency Rating

Most energy efficient - lower running costs

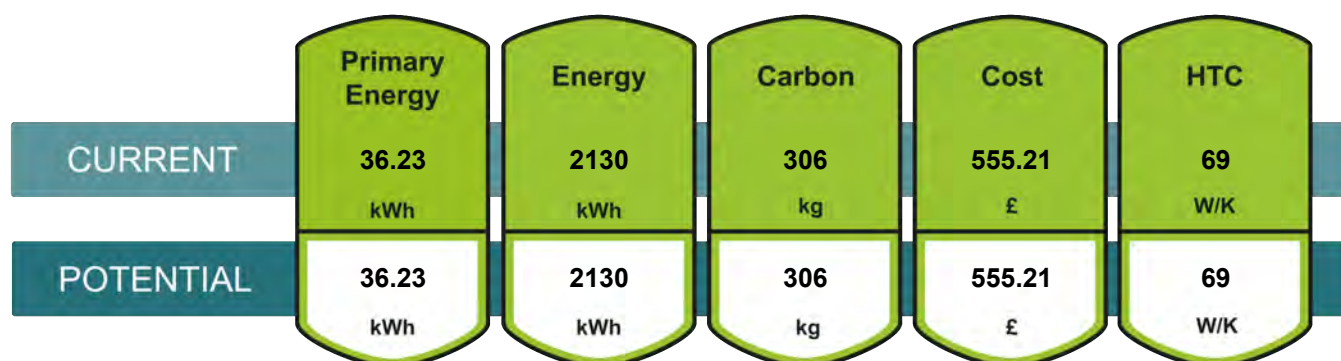


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£67	£67	
Heating		£95	£95	
Hot Water		£394	£394	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£555	£555	

Estimated energy use and potential savings



Space Heating
363
kWh per year



Water Heating
890
kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

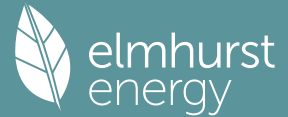
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

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Property Reference	Block C Flat 7				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	83 B	DER	4.39	TER	10.83	
Environmental	97 A	% DER < TER				59.46
CO ₂ Emissions (t/year)	0.29	DFEE	29.88	TFEE	31.14	
Compliance Check	See BREL	% DFEE < TFEE				4.06
% DPER < TPER	17.40	DPER	46.62	TPER	56.44	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		
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)

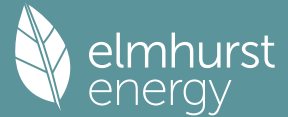
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	4.0000	(17)
Infiltration rate	0.2000	(18)
Number of sides sheltered	2	(19)
Shelter factor	(20) = 1 - [0.075 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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660	190.0000	6402.9997 (29a)
External Roof 1	70.0000		70.0000	0.1300	9.1000	9.0000	630.0000 (30)
Total net area of external elements Aum(A, m ²)			116.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.5334		(33)
Main dwelling							
Party Floor 1			70.0000			30.0000	2100.0000 (32d)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		9132.9997 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							130.4714 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E7 Party floor between dwellings (in blocks of flats)				28.0000	0.0000	0.0000	
E14 Flat roof				28.0000	0.0000	0.0000	
E16 Corner (normal)				10.4000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	32.5334 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 31.4408	Feb 31.3860	Mar 31.3323	Apr 31.0801	May 31.0329	Jun 30.8132	Jul 30.8132	Aug 30.7726	Sep 30.8979	Oct 31.0329	Nov 31.1284	Dec 31.2282	(38)
Heat transfer coeff	63.9742	63.9195	63.8658	63.6135	63.5664	63.3467	63.3467	63.3060	63.4313	63.5664	63.6618	63.7616	(39)
Average = Sum(39)m / 12 =												63.6133	
HLP	Jan 0.9139	Feb 0.9131	Mar 0.9124	Apr 0.9088	May 0.9081	Jun 0.9050	Jul 0.9050	Aug 0.9044	Sep 0.9062	Oct 0.9081	Nov 0.9095	Dec 0.9109	(40)
HLP (average)												0.9088	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461	(42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	26.1376	25.7430	25.1817	24.3411	23.5836	22.5407	21.7495	22.7170	23.2247	24.2581	25.3324	26.1169	26.1169	(42b)
Hot water usage for other uses	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326	37.6326	(42c)
Average daily hot water use (litres/day)													58.4472	(43)
Daily hot water use	Jan 63.7702	Feb 62.0071	Mar 60.0774	Apr 57.8683	May 55.7423	Jun 53.3310	Jul 52.5398	Aug 54.8757	Sep 56.7519	Oct 59.1537	Nov 61.5965	Dec 63.7494	63.7494	(44)
Energy conte	93.8807	82.0480	85.8493	75.5905	71.8296	61.6755	58.0580	64.5897	65.8294	76.2256	83.2498	93.6207	93.6207	(45)
Energy content (annual)													912.4468	
Distribution loss (46)m = 0.15 x (45)m	14.0821	12.3072	12.8774	11.3386	10.7744	9.2513	8.7087	9.6885	9.8744	11.4338	12.4875	14.0431	14.0431	(46)
Water storage loss:													150.0000	(47)
Store volume													1.8600	(48)
a) If manufacturer declared loss factor is known (kWh/day):													0.5400	(49)
Temperature factor from Table 2b													1.0044	(55)
Enter (49) or (54) in (55)														
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	(56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	(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	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	0.0000	(61)
Total heat required for water heating calculated for each month	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	148.0195	(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	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	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	0.0000	(63d)
Output from w/h	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	148.0195	(64)
12Total per year (kWh/year)													1552.9488	(64)
Electric shower(s)	49.5554	44.1543	48.2148	46.0108	46.8741	44.7134	46.2038	46.8741	46.0108	48.2148	47.3081	49.5554	49.5554	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													563.6896	(64a)
Heat gains from water heating, kWh/month	87.1232	77.6270	84.1176	78.7517	79.1209	73.8006	74.3743	76.7137	75.5062	80.9177	81.6228	87.0368	87.0368	(65)

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

Metabolic gains (Table 5), Watts														
(66)m	Jan 112.3062	Feb 112.3062	Mar 112.3062	Apr 112.3062	May 112.3062	Jun 112.3062	Jul 112.3062	Aug 112.3062	Sep 112.3062	Oct 112.3062	Nov 112.3062	Dec 112.3062	112.3062	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	188.5918	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(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	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Water heating gains (Table 5)	117.1011	115.5164	113.0613	109.3774	106.3453	102.5009	99.9654	103.1098	104.8697	108.7604	113.3650	116.9849	116.9849	(72)
Total internal gains	472.1333	483.4221	464.9817	453.6826	433.4179	419.9110	405.3021	406.3991	416.6863	428.1923	450.0294	463.3119	463.3119	(73)

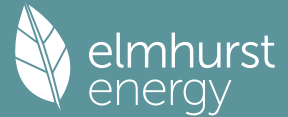
6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast					6.2000	11.2829	0.3500	0.0000		0.7700		18.8527 (75)
Southeast					2.1000	36.7938	0.3500	0.0000		0.7700		20.8235 (77)
Northwest					4.8000	11.2829	0.3500	0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	526.4051	586.9771	636.1808	715.2708	771.5672	775.4744	739.8386	680.7815	618.7081	550.5994	517.0577	508.4480 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)														
tau	Jan 39.6557	Feb 39.6897	Mar 39.7231	Apr 39.8806	May 39.9102	Jun 40.0486	Jul 40.0486	Aug 40.0743	Sep 39.9952	Oct 39.9102	Nov 39.8503	Dec 39.7880	39.7880	
alpha	3.6437	3.6460	3.6482	3.6587	3.6607	3.6699	3.6699	3.6716	3.6663	3.6607	3.6567	3.6525	3.6525	
util living area	0.9600	0.9401	0.9036	0.8132	0.6711	0.4985	0.3701	0.4167	0.6348	0.8508	0.9365	0.9643	0.9643	(86)

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Living	19.5110	19.7374	20.0707	20.5018	20.8057	20.9501	20.9871	20.9801	20.8809	20.4896	19.9389	19.4623
Non living	18.4171	18.7010	19.1153	19.6361	19.9791	20.1262	20.1564	20.1525	20.0651	19.6339	18.9598	18.3576
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	20.2383	19.7374	20.0707	20.5018	20.8057	20.9501	20.9871	20.9801	20.8809	20.4896	19.9389	19.6774 (87)
Th 2	20.1557	20.1563	20.1570	20.1601	20.1606	20.1633	20.1633	20.1638	20.1623	20.1606	20.1595	20.1583 (88)
util rest of house	0.9537	0.9309	0.8888	0.7859	0.6278	0.4404	0.3024	0.3451	0.5754	0.8224	0.9252	0.9587 (89)
MIT 2	19.4626	18.7010	19.1153	19.6361	19.9791	20.1262	20.1564	20.1525	20.0651	19.6339	18.9598	18.6821 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	19.7618	19.1007	19.4838	19.9700	20.2979	20.4440	20.4768	20.4717	20.3798	19.9640	19.3375	19.0660 (92)
Temperature adjustment												0.0000
adjusted MIT	19.7618	19.1007	19.4838	19.9700	20.2979	20.4440	20.4768	20.4717	20.3798	19.9640	19.3375	19.0660 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9504	0.9169	0.8750	0.7792	0.6352	0.4603	0.3280	0.3719	0.5915	0.8149	0.9118	0.9496 (94)
Useful gains	500.2787	538.2243	556.6543	557.3254	490.1150	356.9507	242.6997	253.1872	365.9509	448.7049	471.4594	482.8040 (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	989.1550	907.7038	829.2212	704.2001	546.5370	370.1955	245.5829	257.7646	398.3341	595.2337	779.0596	947.8777 (97)
Space heating kWh	363.7240	248.2902	202.7898	105.7498	41.9780	0.0000	0.0000	0.0000	0.0000	109.0174	221.4721	346.0148 (98a)
Space heating requirement - total per year (kWh/year)												1639.0361
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	363.7240	248.2902	202.7898	105.7498	41.9780	0.0000	0.0000	0.0000	0.0000	109.0174	221.4721	346.0148 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1639.0361
Space heating per m2										(98c) / (4) =		23.4148 (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 %)												306.2798 (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	363.7240	248.2902	202.7898	105.7498	41.9780	0.0000	0.0000	0.0000	0.0000	109.0174	221.4721	346.0148 (98)
Space heating efficiency (main heating system 1)	306.2798	306.2798	306.2798	306.2798	306.2798	0.0000	0.0000	0.0000	0.0000	306.2798	306.2798	306.2798 (210)
Space heating fuel (main heating system)	118.7554	81.0665	66.2106	34.5272	13.7058	0.0000	0.0000	0.0000	0.0000	35.5941	72.3104	112.9734 (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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195 (64)
Efficiency of water heater (217)m	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971 (216)
Fuel for water heating, kWh/month	79.8072	70.6052	75.4846	69.0186	67.9388	61.5292	60.5267	64.0422	63.7649	70.3048	73.1409	79.6673 (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	23.9244	19.1931	17.2812	12.6610	9.7797	7.9901	8.9214	11.5963	15.0625	19.7628	22.3220	24.5894 (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												535.1433 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												185.7971
Water heating fuel used												835.8304 (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)												193.0839 (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												2127.7473 (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	535.1433	0.1558	83.3789 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	835.8304	0.1404	117.3376 (264)
Energy for instantaneous electric shower(s)	563.6896	0.1391	78.4217 (264a)
Space and water heating			200.7165 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	193.0839	0.1443	27.8680 (268)
Total CO ₂ , kg/year			307.0062 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.3900 (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	535.1433	1.5768	843.8128 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	835.8304	1.5191	1269.6800 (278)
Energy for instantaneous electric shower(s)	563.6896	1.5143	853.6145 (278a)
Space and water heating			2113.4928 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	193.0839	1.5338	296.1585 (282)
Total Primary energy kWh/year			3263.2658 (286)
Dwelling Primary energy Rate (DPER)			46.6200 (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	70.0000 (1b)	x 2.6000 (2b)	= 182.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	182.0000 (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) = 0.1099 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3599 (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) = 0.3059 (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	0.3900	0.3824	0.3747	0.3365	0.3288	0.2906	0.2906	0.2830	0.3059	0.3288	0.3441	0.3594 (22b)
Effective ac	0.5761	0.5731	0.5702	0.5566	0.5541	0.5422	0.5422	0.5400	0.5468	0.5541	0.5592	0.5646 (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							
TER Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660		(29a)
External Roof 1	70.0000		70.0000	0.1100	7.7000		(30)
Total net area of external elements A _{um} (A, m ²)			116.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.7660		(33)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							130.4714 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

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E7 Party floor between dwellings (in blocks of flats)	28.0000	0.0700	1.9600									
E14 Flat roof	28.0000	0.0800	2.2400									
E16 Corner (normal)	10.4000	0.0900	0.9360									
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				5.1360 (36)								
Point Thermal bridges			(36a) =	0.0000								
Total fabric heat loss			(33) + (36) + (36a) =	33.9020 (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	34.5983	34.4209	34.2470	33.4303	33.2775	32.5662	32.5662	32.4345	32.8402	33.2775	33.5866	33.9098 (38)
Heat transfer coeff	68.5003	68.3229	68.1490	67.3323	67.1795	66.4682	66.4682	66.3365	66.7422	67.1795	67.4886	67.8118 (39)
Average = Sum(39)m / 12 =												67.3316
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9786	0.9760	0.9736	0.9619	0.9597	0.9495	0.9495	0.9477	0.9535	0.9597	0.9641	0.9687 (40)
HLP (average)												0.9619
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461 (42)
Hot water usage for mixer showers													61.6427 (42a)
Hot water usage for baths													26.6432 (42b)
Hot water usage for other uses													37.6326 (42c)
Average daily hot water use (litres/day)													116.0487 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	126.2459	123.5505	120.2678	115.2758	111.2220	106.8639	105.1887	108.4572	111.9043	116.4797	121.5487	125.9184	(44)
Energy content (annual)	199.9426	175.9342	184.8472	157.8067	149.7262	131.4016	127.2166	134.2926	137.9892	158.0618	173.1684	197.1578	(45)
Distribution loss (46)m = 0.15 x (45)m													1927.5450
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss													
If cylinder contains dedicated solar storage													
Primary loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
Combi loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(57)
Total heat required for water heating calculated for each month	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)
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	(61)
PV diverter	246.5375	218.0199	231.4421	202.8986	196.3211	176.4934	173.8115	180.8875	183.0811	204.6567	218.2602	243.7527	(62)
Solar input	-28.2888	-25.0189	-26.1983	-21.6933	-20.2173	-17.3001	-16.2161	-17.2442	-17.8994	-21.1014	-23.9053	-27.7650	(63a)
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	(63b)
Output from w/h	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)
12Total per year (kWh/year)	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878	(64)
Electric shower(s)													2213.3143 (64)
Heat gains from water heating, kWh/month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
	103.7568	92.1667	98.7376	88.5442	87.0599	79.7645	79.5754	81.9282	81.9549	89.8315	93.6520	102.8309	(65)

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

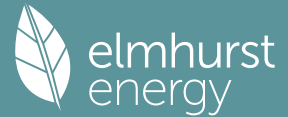
Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	(68)
Pumps, fans	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Water heating gains (Table 5)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Total internal gains	139.4581	137.1528	132.7118	122.9781	117.0160	110.7840	106.9562	110.1186	113.8262	120.7412	130.0722	138.2136	(72)
	497.4904	508.0585	487.6322	470.2832	447.0886	428.1941	412.2929	413.4079	425.6429	443.1731	469.7366	487.5406	(73)

6. Solar gains

[Jan]												
				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d			Gains W
Northeast				6.2000	11.2829	0.6300	0.7000		0.7700			21.3789 (75)
Southeast				2.1000	36.7938	0.6300	0.7000		0.7700			23.6138 (77)
Northwest				4.8000	11.2829	0.6300	0.7000		0.7700			16.5514 (81)
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843 (83)
Total gains	559.0345	625.4899	681.7720	766.9243	830.5499	831.4030	791.6573	724.5575	654.7355	581.9828	545.7467	538.7249 (84)

7. Mean internal temperature (heating season)

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Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	37.0355	37.1317	37.2264	37.6780	37.7637	38.1678	38.1678	38.2436	38.0111	37.7637	37.5907	37.4116
alpha	3.4690	3.4754	3.4818	3.5119	3.5176	3.5445	3.5445	3.5496	3.5341	3.5176	3.5060	3.4941
util living area	0.9555	0.9341	0.8949	0.8013	0.6576	0.4873	0.3625	0.4096	0.6279	0.8437	0.9314	0.9601 (86)
MIT	19.4194	19.6622	20.0186	20.4784	20.7951	20.9469	20.9857	20.9781	20.8709	20.4587	19.8810	19.3829 (87)
Th 2	20.1012	20.1033	20.1054	20.1152	20.1170	20.1256	20.1256	20.1272	20.1223	20.1170	20.1133	20.1095 (88)
util rest of house	0.9484	0.9239	0.8787	0.7723	0.6126	0.4278	0.2932	0.3363	0.5664	0.8137	0.9191	0.9537 (89)
MIT 2	18.2647	18.5693	19.0123	19.5708	19.9275	20.0866	20.1182	20.1150	20.0182	19.5624	18.8550	18.2244 (90)
Living area fraction									fLA = Living area /	(4) =		0.3857 (91)
MIT	18.7101	18.9908	19.4005	19.9208	20.2622	20.4185	20.4528	20.4479	20.3471	19.9081	19.2507	18.6712 (92)
Temperature adjustment												0.0000
adjusted MIT	18.7101	18.9908	19.4005	19.9208	20.2622	20.4185	20.4528	20.4479	20.3471	19.9081	19.2507	18.6712 (93)

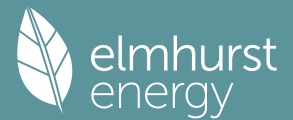
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9345	0.9085	0.8638	0.7654	0.6203	0.4481	0.3195	0.3636	0.5829	0.8057	0.9045	0.9405 (94)
Useful gains	522.4200	568.2271	588.9029	586.9748	515.2227	372.5816	252.8968	263.4851	381.6523	468.9145	493.6411	506.6684 (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	987.0949	962.7274	879.1546	742.0589	575.2024	386.7425	256.0876	268.5260	416.9436	625.3146	820.0373	981.3190 (97)
Space heating kWh	345.7181	265.1042	215.9473	111.6606	44.6249	0.0000	0.0000	0.0000	0.0000	116.3617	235.0053	353.1400 (98a)
Space heating requirement - total per year (kWh/year)												1687.5621
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	345.7181	265.1042	215.9473	111.6606	44.6249	0.0000	0.0000	0.0000	0.0000	116.3617	235.0053	353.1400 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1687.5621
Space heating per m2										(98c) / (4) =		24.1080 (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	345.7181	265.1042	215.9473	111.6606	44.6249	0.0000	0.0000	0.0000	0.0000	116.3617	235.0053	353.1400 (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)	374.5592	287.2201	233.9624	120.9757	48.3477	0.0000	0.0000	0.0000	0.0000	126.0690	254.6103	382.6003 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878 (64)
Efficiency of water heater (217)m	85.0864	84.7720	84.1740	83.0076	81.4693	79.8000	79.8000	79.8000	79.8000	83.0664	84.4868	79.8000 (216)
Fuel for water heating, kWh/month	256.5025	227.6707	243.8328	218.2997	216.1596	199.4903	197.4880	205.0668	206.9946	220.9743	230.0418	253.6400 (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	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	20.9948	16.8428	15.1651	11.1106	8.5821	7.0117	7.8289	10.1763	13.2180	17.3428	19.5886	21.5783 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-32.8701	-46.4063	-66.8089	-75.2540	-81.2811	-75.9327	-75.0050	-70.7452	-63.2427	-53.1331	-36.1640	-28.4114 (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)	-18.3768	-38.6803	-76.9148	-115.5671	-152.8459	-153.5740	-151.7560	-128.4671	-94.1378	-55.3206	-24.5385	-14.5294 (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												1828.3446 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2676.1612 (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)												169.4401 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1729.9627 (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												

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Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3029.9832 (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	1828.3446	0.2100	383.9524 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2676.1612	0.2100	561.9938 (264)
Space and water heating			945.9462 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	169.4401	0.1443	24.4554 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	0.1345	-94.8895
PV Unit electricity exported	-1024.7084	0.1259	-128.9966
Total			-223.8861 (269)
Total CO2, kg/year			758.4448 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.8300 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1828.3446	1.1300	2066.0294 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2676.1612	1.1300	3024.0621 (278)
Space and water heating			5090.0915 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	169.4401	1.5338	259.8929 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	1.4973	-1055.9481
PV Unit electricity exported	-1024.7084	0.4621	-473.5061
Total			-1529.4542 (283)
Total Primary energy kWh/year			3950.6310 (286)
Target Primary Energy Rate (TPER)			56.4400 (287)

Energy Report



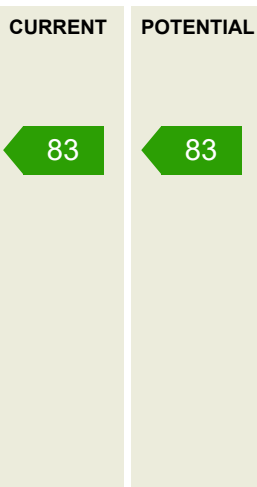
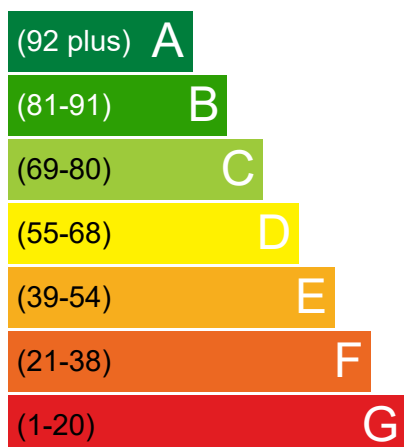
Dwelling Address	
Reference	Block C Flat 7-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

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

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

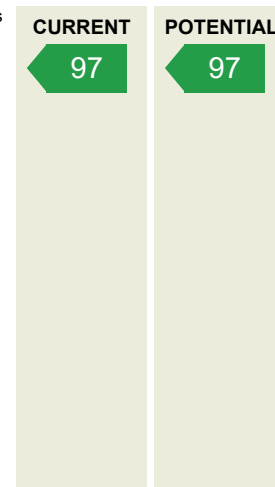
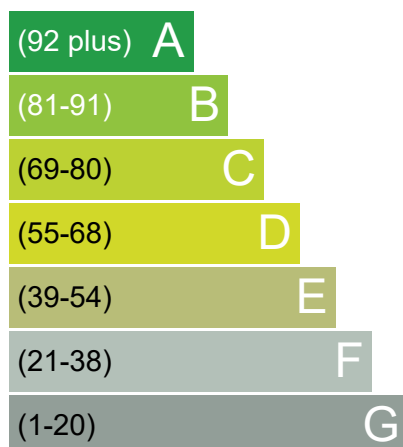
Energy Efficiency Rating

Most energy efficient - lower running costs

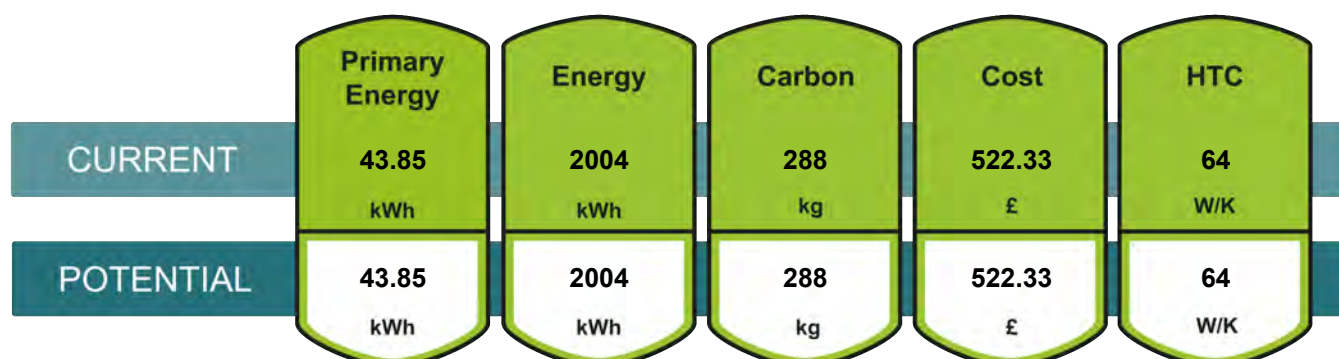


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£50	£50	
Heating		£107	£107	
Hot Water		£365	£365	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£522	£522	

Estimated energy use and potential savings



Space Heating

412

kWh per year



Water Heating

836

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Full SAP Calculation Printout



Property Reference	Block C Flat 8				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	83 B	DER	4.39	TER	10.83	
Environmental	97 A	% DER < TER				59.46
CO ₂ Emissions (t/year)	0.29	DFEE	29.88	TFEE	31.14	
Compliance Check	See BREL	% DFEE < TFEE				4.06
% DPER < TPER	17.40	DPER	46.62	TPER	56.44	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		
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	4.0000	(17)
Infiltration rate	0.2000	(18)
Number of sides sheltered	2	(19)

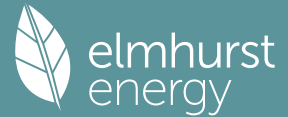
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1700 (21)

	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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660	190.0000	6402.9997 (29a)
External Roof 1	70.0000		70.0000	0.1300	9.1000	9.0000	630.0000 (30)
Total net area of external elements Aum(A, m ²)			116.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.5334		(33)
Main dwelling							
Party Floor 1			70.0000			30.0000	2100.0000 (32d)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		9132.9997 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							130.4714 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E7 Party floor between dwellings (in blocks of flats)				28.0000	0.0000	0.0000	
E14 Flat roof				28.0000	0.0000	0.0000	
E16 Corner (normal)				10.4000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	32.5334 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 31.4408	Feb 31.3860	Mar 31.3323	Apr 31.0801	May 31.0329	Jun 30.8132	Jul 30.8132	Aug 30.7726	Sep 30.8979	Oct 31.0329	Nov 31.1284	Dec 31.2282	(38)
Heat transfer coeff	63.9742	63.9195	63.8658	63.6135	63.5664	63.3467	63.3467	63.3060	63.4313	63.5664	63.6618	63.7616	(39)
Average = Sum(39)m / 12 =												63.6133	
HLP	Jan 0.9139	Feb 0.9131	Mar 0.9124	Apr 0.9088	May 0.9081	Jun 0.9050	Jul 0.9050	Aug 0.9044	Sep 0.9062	Oct 0.9081	Nov 0.9095	Dec 0.9109	(40)
HLP (average)												0.9088	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.2461	(42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	26.1376	25.7430	25.1817	24.3411	23.5836	22.5407	21.7495	22.7170	23.2247	24.2581	25.3324	26.1169	26.1169	(42b)
Hot water usage for other uses	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326	37.6326	(42c)
Average daily hot water use (litres/day)													58.4472	(43)
Daily hot water use	Jan 63.7702	Feb 62.0071	Mar 60.0774	Apr 57.8683	May 55.7423	Jun 53.3310	Jul 52.5398	Aug 54.8757	Sep 56.7519	Oct 59.1537	Nov 61.5965	Dec 63.7494	63.7494	(44)
Energy conte	93.8807	82.0480	85.8493	75.5905	71.8296	61.6755	58.0580	64.5897	65.8294	76.2256	83.2498	93.6207	93.6207	(45)
Energy content (annual)													912.4468	
Distribution loss (46)m = 0.15 x (45)m	14.0821	12.3072	12.8774	11.3386	10.7744	9.2513	8.7087	9.6885	9.8744	11.4338	12.4875	14.0431	14.0431	(46)
Water storage loss:													150.0000	(47)
Store volume													1.8600	(48)
a) If manufacturer declared loss factor is known (kWh/day):													0.5400	(49)
Temperature factor from Table 2b													1.0044	(55)
Enter (49) or (54) in (55)														
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	(56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	(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	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	0.0000	(61)
Total heat required for water heating calculated for each month	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	148.0195	(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	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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	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	0.0000	(63d)
Output from w/h	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	148.0195	(64)
12Total per year (kWh/year)													1552.9488	(64)
Electric shower(s)	49.5554	44.1543	48.2148	46.0108	46.8741	44.7134	46.2038	46.8741	46.0108	48.2148	47.3081	49.5554	49.5554	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													563.6896	(64a)
Heat gains from water heating, kWh/month	87.1232	77.6270	84.1176	78.7517	79.1209	73.8006	74.3743	76.7137	75.5062	80.9177	81.6228	87.0368	87.0368	(65)

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

Metabolic gains (Table 5), Watts														
(66)m	Jan 112.3062	Feb 112.3062	Mar 112.3062	Apr 112.3062	May 112.3062	Jun 112.3062	Jul 112.3062	Aug 112.3062	Sep 112.3062	Oct 112.3062	Nov 112.3062	Dec 112.3062	112.3062	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	188.5918	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(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	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Water heating gains (Table 5)	117.1011	115.5164	113.0613	109.3774	106.3453	102.5009	99.9654	103.1098	104.8697	108.7604	113.3650	116.9849	116.9849	(72)
Total internal gains	472.1333	483.4221	464.9817	453.6826	433.4179	419.9110	405.3021	406.3991	416.6863	428.1923	450.0294	463.3119	463.3119	(73)

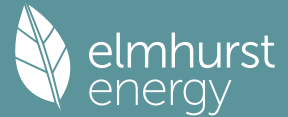
6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast					6.2000	11.2829	0.3500	0.0000		0.7700		18.8527 (75)
Southeast					2.1000	36.7938	0.3500	0.0000		0.7700		20.8235 (77)
Northwest					4.8000	11.2829	0.3500	0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	526.4051	586.9771	636.1808	715.2708	771.5672	775.4744	739.8386	680.7815	618.7081	550.5994	517.0577	508.4480 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)														
tau	Jan 39.6557	Feb 39.6897	Mar 39.7231	Apr 39.8806	May 39.9102	Jun 40.0486	Jul 40.0486	Aug 40.0743	Sep 39.9952	Oct 39.9102	Nov 39.8503	Dec 39.7880	39.7880	
alpha	3.6437	3.6460	3.6482	3.6587	3.6607	3.6699	3.6699	3.6716	3.6663	3.6607	3.6567	3.6525	3.6525	
util living area	0.9600	0.9401	0.9036	0.8132	0.6711	0.4985	0.3701	0.4167	0.6348	0.8508	0.9365	0.9643	0.9643	(86)

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Living	19.5110	19.7374	20.0707	20.5018	20.8057	20.9501	20.9871	20.9801	20.8809	20.4896	19.9389	19.4623
Non living	18.4171	18.7010	19.1153	19.6361	19.9791	20.1262	20.1564	20.1525	20.0651	19.6339	18.9598	18.3576
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	20.2383	19.7374	20.0707	20.5018	20.8057	20.9501	20.9871	20.9801	20.8809	20.4896	19.9389	19.6774 (87)
Th 2	20.1557	20.1563	20.1570	20.1601	20.1606	20.1633	20.1633	20.1638	20.1623	20.1606	20.1595	20.1583 (88)
util rest of house	0.9537	0.9309	0.8888	0.7859	0.6278	0.4404	0.3024	0.3451	0.5754	0.8224	0.9252	0.9587 (89)
MIT 2	19.4626	18.7010	19.1153	19.6361	19.9791	20.1262	20.1564	20.1525	20.0651	19.6339	18.9598	18.6821 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	19.7618	19.1007	19.4838	19.9700	20.2979	20.4440	20.4768	20.4717	20.3798	19.9640	19.3375	19.0660 (92)
Temperature adjustment												0.0000
adjusted MIT	19.7618	19.1007	19.4838	19.9700	20.2979	20.4440	20.4768	20.4717	20.3798	19.9640	19.3375	19.0660 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9504	0.9169	0.8750	0.7792	0.6352	0.4603	0.3280	0.3719	0.5915	0.8149	0.9118	0.9496	(94)
Useful gains	500.2787	538.2243	556.6543	557.3254	490.1150	356.9507	242.6997	253.1872	365.9509	448.7049	471.4594	482.8040	(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	989.1550	907.7038	829.2212	704.2001	546.5370	370.1955	245.5829	257.7646	398.3341	595.2337	779.0596	947.8777	(97)
Space heating kWh	363.7240	248.2902	202.7898	105.7498	41.9780	0.0000	0.0000	0.0000	0.0000	109.0174	221.4721	346.0148	(98a)
Space heating requirement - total per year (kWh/year)												1639.0361	
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	363.7240	248.2902	202.7898	105.7498	41.9780	0.0000	0.0000	0.0000	0.0000	109.0174	221.4721	346.0148	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1639.0361	
Space heating per m2										(98c) / (4) =		23.4148	(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 %)													306.2798	(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	363.7240	248.2902	202.7898	105.7498	41.9780	0.0000	0.0000	0.0000	0.0000	109.0174	221.4721	346.0148	(98)	
Space heating efficiency (main heating system 1)	306.2798	306.2798	306.2798	306.2798	306.2798	0.0000	0.0000	0.0000	0.0000	306.2798	306.2798	306.2798	(210)	
Space heating fuel (main heating system)	118.7554	81.0665	66.2106	34.5272	13.7058	0.0000	0.0000	0.0000	0.0000	35.5941	72.3104	112.9734	(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	148.2795	131.1824	140.2481	128.2345	126.2284	114.3195	112.4568	118.9885	118.4734	130.6244	135.8938	148.0195	(64)	
Efficiency of water heater	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	185.7971	(216)	
Fuel for water heating, kWh/month	79.8072	70.6052	75.4846	69.0186	67.9388	61.5292	60.5267	64.0422	63.7649	70.3048	73.1409	79.6673	(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	23.9244	19.1931	17.2812	12.6610	9.7797	7.9901	8.9214	11.5963	15.0625	19.7628	22.3220	24.5894	(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													535.1433	(211)
Space heating fuel - main system 2													0.0000	(213)
Space heating fuel - secondary													0.0000	(215)
Efficiency of water heater													185.7971	
Water heating fuel used													835.8304	(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)													193.0839	(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													2127.7473	(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	535.1433	0.1558	83.3789 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	835.8304	0.1404	117.3376 (264)
Energy for instantaneous electric shower(s)	563.6896	0.1391	78.4217 (264a)
Space and water heating			200.7165 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	193.0839	0.1443	27.8680 (268)
Total CO2, kg/year			307.0062 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.3900 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	535.1433	1.5768	843.8128 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	835.8304	1.5191	1269.6800 (278)
Energy for instantaneous electric shower(s)	563.6896	1.5143	853.6145 (278a)
Space and water heating			2113.4928 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	193.0839	1.5338	296.1585 (282)
Total Primary energy kWh/year			3263.2658 (286)
Dwelling Primary energy Rate (DPER)			46.6200 (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	70.0000 (1b)	x 2.6000 (2b)	= 182.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	182.0000 (5)

2. Ventilation rate

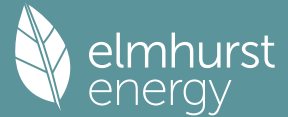
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1099 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3599 (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) = 0.3059 (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	0.3900	0.3824	0.3747	0.3365	0.3288	0.2906	0.2906	0.2830	0.3059	0.3288	0.3441	0.3594 (22b)
Effective ac	0.5761	0.5731	0.5702	0.5566	0.5541	0.5422	0.5422	0.5400	0.5468	0.5541	0.5592	0.5646 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660		(29a)
External Roof 1	70.0000		70.0000	0.1100	7.7000		(30)
Total net area of external elements Aum(A, m2)			116.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.7660		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							130.4714 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

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E7 Party floor between dwellings (in blocks of flats)	28.0000	0.0700	1.9600	
E14 Flat roof	28.0000	0.0800	2.2400	
E16 Corner (normal)	10.4000	0.0900	0.9360	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				5.1360 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	33.9020 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	34.5983	34.4209	34.2470	33.4303	33.2775	32.5662	32.5662	32.4345	32.8402	33.2775	33.5866	33.9098	(38)
Average = Sum(39)m / 12 =	68.5003	68.3229	68.1490	67.3323	67.1795	66.4682	66.4682	66.3365	66.7422	67.1795	67.4886	67.8118	(39)
												67.3316	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.9786	0.9760	0.9736	0.9619	0.9597	0.9495	0.9495	0.9477	0.9535	0.9597	0.9641	0.9687	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

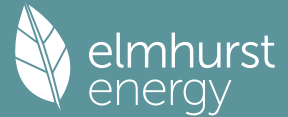
4. Water heating energy requirements (kWh/year)													
Assumed occupancy													2.2461 (42)
Hot water usage for mixer showers													
Hot water usage for baths	61.8798	60.9498	59.5947	57.0020	55.0887	52.9549	51.7420	53.0869	54.5611	56.8521	59.5005	61.6427	(42a)
Hot water usage for other uses	26.7336	26.3365	25.7774	24.7465	23.9746	23.1187	22.6564	23.2116	23.8161	24.7319	25.7840	26.6432	(42b)
Average daily hot water use (litres/day)	37.6326	36.2641	34.8957	33.5272	32.1587	30.7903	30.7903	32.1587	33.5272	34.8957	36.2641	37.6326	(42c)
												116.0487	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	126.2459	123.5505	120.2678	115.2758	111.2220	106.8639	105.1887	108.4572	111.9043	116.4797	121.5487	125.9184	(44)
Energy content (annual)	199.9426	175.9342	184.8472	157.8067	149.7262	131.4016	127.2166	134.2926	137.9892	158.0618	173.1684	197.1578	(45)
Distribution loss (46)m = 0.15 x (45)m													1927.5450
Water storage loss:	29.9914	26.3901	27.7271	23.6710	22.4589	19.7102	19.0825	20.1439	20.6984	23.7093	25.9753	29.5737	(46)
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.3938 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.7527 (55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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	246.5375	218.0199	231.4421	202.8986	196.3211	176.4934	173.8115	180.8875	183.0811	204.6567	218.2602	243.7527	(62)
WWHRS	-28.2888	-25.0189	-26.1983	-21.6933	-20.2173	-17.3001	-16.2161	-17.2442	-17.8994	-21.1014	-23.9053	-27.7650	(63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878	(64)
12Total per year (kWh/year)													2213.3143 (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	103.7568	92.1667	98.7376	88.5442	87.0599	79.7645	79.5754	81.9282	81.9549	89.8315	93.6520	102.8309	(65)

5. Internal gains (see Table 5 and 5a)													
Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	112.3062	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	101.0433	111.8694	101.0433	104.4114	101.0433	104.4114	101.0433	101.0433	104.4114	101.0433	104.4114	101.0433	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	197.2971	199.3444	194.1852	183.2019	169.3374	156.3068	147.6015	145.5542	150.7134	161.6967	175.5612	188.5918	(68)
Pumps, fans	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	34.2306	(69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Water heating gains (Table 5)	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	-89.8450	(71)
Total internal gains	139.4581	137.1528	132.7118	122.9781	117.0160	110.7840	106.9562	110.1186	113.8262	120.7412	130.0722	138.2136	(72)
	497.4904	508.0585	487.6322	470.2832	447.0886	428.1941	412.2929	413.4079	425.6429	443.1731	469.7366	487.5406	(73)

6. Solar gains													
[Jan]			Area	Solar flux	g	FF	Access	Gains					
			m2	Table 6a	Specific data	Specific data	factor	W					
				W/m2	or Table 6b	or Table 6c	Table 6d						
Northeast			6.2000	11.2829	0.6300	0.7000	0.7700	21.3789	(75)				
Southeast			2.1000	36.7938	0.6300	0.7000	0.7700	23.6138	(77)				
Northwest			4.8000	11.2829	0.6300	0.7000	0.7700	16.5514	(81)				
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843	(83)
Total gains	559.0345	625.4899	681.7720	766.9243	830.5499	831.4030	791.6573	724.5575	654.7355	581.9828	545.7467	538.7249	(84)

7. Mean internal temperature (heating season)

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Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	37.0355	37.1317	37.2264	37.6780	37.7637	38.1678	38.1678	38.2436	38.0111	37.7637	37.5907	37.4116
alpha	3.4690	3.4754	3.4818	3.5119	3.5176	3.5445	3.5445	3.5496	3.5341	3.5176	3.5060	3.4941
util living area	0.9555	0.9341	0.8949	0.8013	0.6576	0.4873	0.3625	0.4096	0.6279	0.8437	0.9314	0.9601 (86)
MIT	19.4194	19.6622	20.0186	20.4784	20.7951	20.9469	20.9857	20.9781	20.8709	20.4587	19.8810	19.3829 (87)
Th 2	20.1012	20.1033	20.1054	20.1152	20.1170	20.1256	20.1256	20.1272	20.1223	20.1170	20.1133	20.1095 (88)
util rest of house	0.9484	0.9239	0.8787	0.7723	0.6126	0.4278	0.2932	0.3363	0.5664	0.8137	0.9191	0.9537 (89)
MIT 2	18.2647	18.5693	19.0123	19.5708	19.9275	20.0866	20.1182	20.1150	20.0182	19.5624	18.8550	18.2244 (90)
Living area fraction									fLA = Living area /	(4) =		0.3857 (91)
MIT	18.7101	18.9908	19.4005	19.9208	20.2622	20.4185	20.4528	20.4479	20.3471	19.9081	19.2507	18.6712 (92)
Temperature adjustment												0.0000
adjusted MIT	18.7101	18.9908	19.4005	19.9208	20.2622	20.4185	20.4528	20.4479	20.3471	19.9081	19.2507	18.6712 (93)

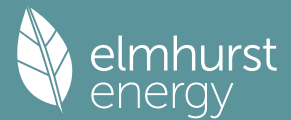
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9345	0.9085	0.8638	0.7654	0.6203	0.4481	0.3195	0.3636	0.5829	0.8057	0.9045	0.9405 (94)
Useful gains	522.4200	568.2271	588.9029	586.9748	515.2227	372.5816	252.8968	263.4851	381.6523	468.9145	493.6411	506.6684 (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	987.0949	962.7274	879.1546	742.0589	575.2024	386.7425	256.0876	268.5260	416.9436	625.3146	820.0373	981.3190 (97)
Space heating kWh	345.7181	265.1042	215.9473	111.6606	44.6249	0.0000	0.0000	0.0000	0.0000	116.3617	235.0053	353.1400 (98a)
Space heating requirement - total per year (kWh/year)												1687.5621
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	345.7181	265.1042	215.9473	111.6606	44.6249	0.0000	0.0000	0.0000	0.0000	116.3617	235.0053	353.1400 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1687.5621
Space heating per m2										(98c) / (4) =		24.1080 (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	345.7181	265.1042	215.9473	111.6606	44.6249	0.0000	0.0000	0.0000	0.0000	116.3617	235.0053	353.1400 (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)	374.5592	287.2201	233.9624	120.9757	48.3477	0.0000	0.0000	0.0000	0.0000	126.0690	254.6103	382.6003 (211)
Space heating efficiency (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	218.2487	193.0011	205.2437	181.2053	176.1038	159.1933	157.5954	163.6433	165.1817	183.5553	194.3549	215.9878 (64)
Efficiency of water heater (217)m	85.0864	84.7720	84.1740	83.0076	81.4693	79.8000	79.8000	79.8000	79.8000	83.0664	84.4868	79.8000 (216)
Fuel for water heating, kWh/month	256.5025	227.6707	243.8328	218.2997	216.1596	199.4903	197.4880	205.0668	206.9946	220.9743	230.0418	253.6400 (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	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	20.9948	16.8428	15.1651	11.1106	8.5821	7.0117	7.8289	10.1763	13.2180	17.3428	19.5886	21.5783 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-32.8701	-46.4063	-66.8089	-75.2540	-81.2811	-75.9327	-75.0050	-70.7452	-63.2427	-53.1331	-36.1640	-28.4114 (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)	-18.3768	-38.6803	-76.9148	-115.5671	-152.8459	-153.5740	-151.7560	-128.4671	-94.1378	-55.3206	-24.5385	-14.5294 (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												1828.3446 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2676.1612 (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)												169.4401 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1729.9627 (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												

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Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3029.9832 (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	1828.3446	0.2100	383.9524 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2676.1612	0.2100	561.9938 (264)
Space and water heating			945.9462 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	169.4401	0.1443	24.4554 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	0.1345	-94.8895
PV Unit electricity exported	-1024.7084	0.1259	-128.9966
Total			-223.8861 (269)
Total CO2, kg/year			758.4448 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.8300 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1828.3446	1.1300	2066.0294 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2676.1612	1.1300	3024.0621 (278)
Space and water heating			5090.0915 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	169.4401	1.5338	259.8929 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-705.2543	1.4973	-1055.9481
PV Unit electricity exported	-1024.7084	0.4621	-473.5061
Total			-1529.4542 (283)
Total Primary energy kWh/year			3950.6310 (286)
Target Primary Energy Rate (TPER)			56.4400 (287)

Energy Report



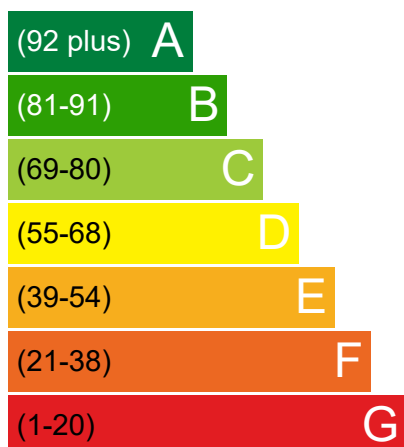
Dwelling Address	
Reference	Block C Flat 8-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	70

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

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

Energy Efficiency Rating

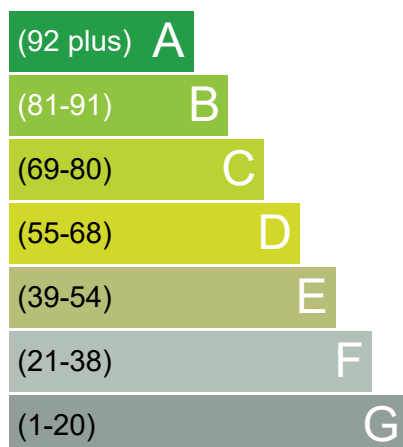
Most energy efficient - lower running costs



CURRENT	POTENTIAL
83	83

Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



CURRENT	POTENTIAL
97	97

Additional ratings for your home

	Primary Energy	Energy	Carbon	Cost	HTC
CURRENT	43.85 kWh	2004 kWh	288 kg	522.33 £	64 W/K
POTENTIAL	43.85 kWh	2004 kWh	288 kg	522.33 £	64 W/K

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£50	£50	
Heating		£107	£107	
Hot Water		£365	£365	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£522	£522	

Estimated energy use and potential savings



Space Heating

412

kWh per year



Water Heating

836

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

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Property Reference	Block C Flat 9				Issued on Date	15/04/2025		
Assessment Reference	Be Green			Prop Type Ref				
Property								
SAP Rating	83 B		DER	4.02		TER	9.70	
Environmental	97 A		% DER < TER				58.56	
CO ₂ Emissions (t/year)	0.34		DFEE	30.45		TFEE	31.31	
Compliance Check	See BREL		% DFEE < TFEE				2.74	
% DPER < TPER	15.51		DPER	42.59		TPER	50.41	
Assessor Details	Mr. Joe Mountain					Assessor ID	AV71-0001	
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	90.0000 (1b)	2.6000 (2b)	234.0000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.0000		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	234.0000 (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)

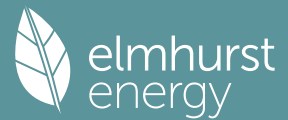
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1700 (21)

	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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	75.4000	13.1000	62.3000	0.1800	11.2140	190.0000	11836.9995 (29a)
External Roof 1	90.0000		90.0000	0.1300	11.7000	9.0000	810.0000 (30)
Total net area of external elements Aum(A, m ²)			165.4000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		40.2814		(33)
Main dwelling							
Party Floor 1			90.0000			30.0000	2700.0000 (32d)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		15346.9995 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							170.5222 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E7 Party floor between dwellings (in blocks of flats)				28.0000	0.0000	0.0000	
E14 Flat roof				28.0000	0.0000	0.0000	
E16 Corner (normal)				10.4000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	40.2814 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							

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(38)m	Jan 40.4239	Feb 40.3535	Mar 40.2844	Apr 39.9602	May 39.8995	Jun 39.6170	Jul 39.6170	Aug 39.5647	Sep 39.7258	Oct 39.8995	Nov 40.0222	Dec 40.1505	(38)
Heat transfer coeff	80.7053	80.6349	80.5659	80.2416	80.1809	79.8985	79.8985	79.8462	80.0073	80.1809	80.3036	80.4320	(39)
Average = Sum(39)m / 12 =												80.2413	
HLP	Jan 0.8967	Feb 0.8959	Mar 0.8952	Apr 0.8916	May 0.8909	Jun 0.8878	Jul 0.8878	Aug 0.8872	Sep 0.8890	Oct 0.8909	Nov 0.8923	Dec 0.8937	(40)
HLP (average)												0.8916	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6257	(42)
Hot water usage for mixer showers														
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths														
28.8136	28.3786	27.7599	26.8332	25.9981	24.8484	23.9763	25.0428	25.6025	26.7416	27.9260	28.7907			(42b)
Hot water usage for other uses														
41.5200	40.0102	38.5004	36.9905	35.4807	33.9709	33.9709	35.4807	36.9905	38.5004	40.0102	41.5200			(42c)
Average daily hot water use (litres/day)													64.4625	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
70.3336	68.3888	66.2602	63.8238	61.4788	58.8194	57.9472	60.5235	62.5931	65.2420	67.9362	70.3107			(44)
Energy content (annual)	103.5432	90.4923	94.6845	83.3698	79.2217	68.0226	64.0333	71.2373	72.6048	84.0709	91.8180	103.2565		(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		1006.3550		
15.5315	13.5738	14.2027	12.5055	11.8833	10.2034	9.6050	10.6856	10.8907	12.6106	13.7727	15.4885			(46)
Water storage loss:														
Store volume													150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8600	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													1.0044	(55)
Total storage loss														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364			(56)
If cylinder contains dedicated solar storage														
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364			(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	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														
157.9420	139.6267	149.0833	136.0138	133.6205	120.6666	118.4321	125.6361	125.2488	138.4697	144.4620	157.6553			(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63d)
Output from w/h														
157.9420	139.6267	149.0833	136.0138	133.6205	120.6666	118.4321	125.6361	125.2488	138.4697	144.4620	157.6553			(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		1646.8570		(64)
Electric shower(s)												1647		(64)
54.6524	48.6958	53.1739	50.7432	51.6954	49.3124	50.9561	51.6954	50.7432	53.1739	52.1740	54.6524			(64a)
Heat gains from water heating, kWh/month										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		621.6683		(64a)
91.6103	81.5701	88.2951	82.5215	82.7841	77.0608	77.5492	80.1293	78.9421	84.7661	85.6882	91.5149			(65)

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

Metabolic gains (Table 5), Watts													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	128.2865	142.0315	128.2865	132.5627	128.2865	132.5627	128.2865	128.2865	132.5627	128.2865	132.5627	128.2865	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	239.0777	241.5586	235.3069	221.9977	205.1972	189.4071	178.8584	176.3775	182.6292	195.9384	212.7389	228.5290	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	(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)	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	(71)
Water heating gains (Table 5)	123.1321	121.3841	118.6762	114.6131	111.2689	107.0289	104.2327	107.7007	109.6418	113.9329	119.0114	123.0039	(72)
Total internal gains	552.8821	567.3601	544.6554	531.5594	507.1385	491.3846	473.7634	474.7505	487.2196	500.5437	526.6988	542.2053	(73)

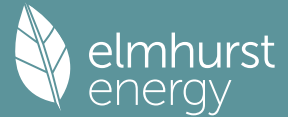
6. Solar gains

[Jan]													
				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	607.1539	670.9151	715.8545	793.1476	845.2878	846.9480	808.2999	749.1328	689.2413	622.9509	593.7271	587.3414	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	52.8225	52.8686	52.9139	53.1278	53.1680	53.3559	53.3559	53.3909	53.2834	53.1680	53.0867	53.0020	
alpha	4.5215	4.5246	4.5276	4.5419	4.5445	4.5571	4.5571	4.5594	4.5522	4.5445	4.5391	4.5335	
util living area													
	0.9849	0.9750	0.9548	0.8916	0.7648	0.5782	0.4293	0.4804	0.7190	0.9161	0.9725	0.9869 (86)	

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Living	19.7288	19.9078	20.1779	20.5522	20.8316	20.9632	20.9923	20.9874	20.9041	20.5531	20.0854	19.6908
Non living	18.6806	18.9073	19.2470	19.7053	20.0218	20.1525	20.1744	20.1722	20.1024	19.7154	19.1364	18.6343
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	20.3497	19.9078	20.1779	20.5522	20.8316	20.9632	20.9923	20.9874	20.9041	20.5531	20.0854	19.8740 (87)
Th 2	20.1703	20.1709	20.1716	20.1747	20.1752	20.1779	20.1779	20.1784	20.1769	20.1752	20.1741	20.1729 (88)
util rest of house	0.9817	0.9698	0.9452	0.8690	0.7206	0.5124	0.3517	0.3989	0.6558	0.8937	0.9659	0.9842 (89)
MIT 2	19.5764	18.9073	19.2470	19.7053	20.0218	20.1525	20.1744	20.1722	20.1024	19.7154	19.1364	18.9115 (90)
Living area fraction									FLA = Living area / (4) =			
MIT	19.7311	19.1074	19.4332	19.8747	20.1838	20.3147	20.3380	20.3352	20.2627	19.8830	19.3262	19.1040 (92)
Temperature adjustment												0.0000
adjusted MIT	19.7311	19.1074	19.4332	19.8747	20.1838	20.3147	20.3380	20.3352	20.2627	19.8830	19.3262	19.1040 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9797	0.9612	0.9346	0.8596	0.7211	0.5237	0.3670	0.4148	0.6629	0.8842	0.9570	0.9795	(94)
Useful gains	594.8351	644.8610	669.0303	681.8093	609.5508	443.5728	296.6339	310.7108	456.8818	550.8367	568.2237	575.3103	(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	1245.3686	1145.6134	1041.9715	880.6270	680.2363	456.5923	298.6575	314.2113	493.0633	744.3179	981.8098	1198.7597	(97)
Space heating kWh	483.9969	336.5056	277.4683	143.1487	52.5900	0.0000	0.0000	0.0000	0.0000	143.9500	297.7820	463.8464	(98a)
Space heating requirement - total per year (kWh/year)												2199.2879	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	483.9969	336.5056	277.4683	143.1487	52.5900	0.0000	0.0000	0.0000	0.0000	143.9500	297.7820	463.8464	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2199.2879	
Space heating per m2										(98c) / (4) =		24.4365	(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 %)													303.9310 (206)
Efficiency of main space heating system 2 (in %)													0.0000 (207)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	483.9969	336.5056	277.4683	143.1487	52.5900	0.0000	0.0000	0.0000	0.0000	143.9500	297.7820	463.8464	(98)
Space heating efficiency (main heating system 1)	303.9310	303.9310	303.9310	303.9310	303.9310	0.0000	0.0000	0.0000	0.0000	303.9310	303.9310	303.9310	(210)
Space heating fuel (main heating system)	159.2456	110.7177	91.2932	47.0991	17.3033	0.0000	0.0000	0.0000	0.0000	47.3627	97.9768	152.6157	(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	157.9420	139.6267	149.0833	136.0138	133.6205	120.6666	118.4321	125.6361	125.2488	138.4697	144.4620	157.6553	(64)
Efficiency of water heater													
(217)m	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	(216)
Fuel for water heating, kWh/month	85.7449	75.8017	80.9356	73.8403	72.5410	65.5085	64.2954	68.2064	67.9961	75.1736	78.4267	85.5892	(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	31.7135	25.4418	22.9075	16.7830	12.9637	10.5914	11.8259	15.3718	19.9664	26.1970	29.5894	32.5949	(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													723.6141 (211)
Space heating fuel - main system 2													0.0000 (213)
Space heating fuel - secondary													0.0000 (215)
Efficiency of water heater													184.2000
Water heating fuel used													894.0592 (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)													255.9463 (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													2495.2878 (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	723.6141	0.1558	112.7711 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	894.0592	0.1405	125.5719 (264)
Energy for instantaneous electric shower(s)	621.6683	0.1391	86.4878 (264a)
Space and water heating			238.3430 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	255.9463	0.1443	36.9410 (268)
Total CO2, kg/year			361.7718 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.0200 (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	723.6141	1.5769	1141.1011 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	894.0592	1.5193	1358.3574 (278)
Energy for instantaneous electric shower(s)	621.6683	1.5143	941.4135 (278a)
Space and water heating			2499.4585 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	255.9463	1.5338	392.5789 (282)
Total Primary energy kWh/year			3833.4509 (286)
Dwelling Primary energy Rate (DPER)			42.5900 (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	90.0000 (1b)	x 2.6000 (2b)	= 234.0000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	90.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	234.0000 (5)

2. Ventilation rate

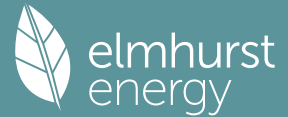
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1282 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3782 (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) = 0.3215 (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	0.4099	0.4018	0.3938	0.3536	0.3456	0.3054	0.3054	0.2974	0.3215	0.3456	0.3617	0.3777 (22b)
Effective ac	0.5840	0.5807	0.5775	0.5625	0.5597	0.5466	0.5466	0.5442	0.5517	0.5597	0.5654	0.5713 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	75.4000	13.1000	62.3000	0.1800	11.2140		(29a)
External Roof 1	90.0000		90.0000	0.1100	9.9000		(30)
Total net area of external elements Aum(A, m2)			165.4000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		36.1140		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							170.5222 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

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E7 Party floor between dwellings (in blocks of flats)	28.0000	0.0700	1.9600	
E14 Flat roof	28.0000	0.0800	2.2400	
E16 Corner (normal)	10.4000	0.0900	0.9360	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				5.1360 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	41.2500 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	45.0965	44.8447	44.5978	43.4381	43.2212	42.2111	42.2111	42.0241	42.6002	43.2212	43.6601	44.1189	(38)
Average = Sum(39)m / 12 =	86.3465	86.0947	85.8478	84.6881	84.4711	83.4611	83.4611	83.2741	83.8502	84.4711	84.9101	85.3689	(39)
												84.6871	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.9594	0.9566	0.9539	0.9410	0.9386	0.9273	0.9273	0.9253	0.9317	0.9386	0.9434	0.9485	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

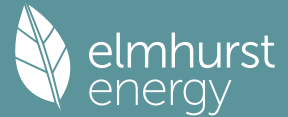
4. Water heating energy requirements (kWh/year)													
Assumed occupancy													2.6257 (42)
Hot water usage for mixer showers													
Hot water usage for baths	68.2445	67.2189	65.7244	62.8650	60.7548	58.4016	57.0640	58.5472	60.1730	62.6997	65.6205	67.9830	(42a)
Hot water usage for other uses	29.4706	29.0329	28.4165	27.2801	26.4292	25.4856	24.9760	25.5880	26.2544	27.2640	28.4238	29.3709	(42b)
Average daily hot water use (litres/day)	41.5200	40.0102	38.5004	36.9905	35.4807	33.9709	33.9709	35.4807	36.9905	38.5004	40.0102	41.5200	(42c)
												127.9884	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	139.2350	136.2620	132.6413	127.1357	122.6647	117.8581	116.0109	119.6159	123.4179	128.4640	134.0545	138.8739	(44)
Energy content (annual)	220.5143	194.0352	203.8648	174.0424	165.1303	144.9203	140.3051	148.1094	152.1866	174.3245	190.9852	217.4430	(45)
Distribution loss (46)m = 0.15 x (45)m													
Water storage loss:	33.0771	29.1053	30.5797	26.1064	24.7695	21.7380	21.0458	22.2164	22.8280	26.1487	28.6478	32.6165	(46)
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(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	267.1092	236.1209	250.4597	219.1342	211.7252	190.0121	186.9000	194.7043	197.2785	220.9194	236.0771	264.0379	(62)
WWHRS	-31.1985	-27.5922	-28.8930	-23.9245	-22.2968	-19.0795	-17.8840	-19.0179	-19.7404	-23.2718	-26.3641	-30.6208	(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	235.9106	208.5287	221.5667	195.2097	189.4284	170.9326	169.0160	175.6865	177.5380	197.6476	209.7130	233.4172	(64)
12Total per year (kWh/year)												2384.5950	(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	110.5969	98.1853	105.0610	93.9426	92.1818	84.2595	83.9274	86.5223	86.6755	95.2388	99.5761	109.5757	(65)

5. Internal gains (see Table 5 and 5a)													
Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	131.2860	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	128.2865	142.0315	128.2865	132.5627	128.2865	132.5627	128.2865	128.2865	132.5627	128.2865	132.5627	128.2865	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	239.0777	241.5586	235.3069	221.9977	205.1972	189.4071	178.8584	176.3775	182.6292	195.9384	212.7389	228.5290	(68)
Pumps, fans	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	36.1286	(69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Water heating gains (Table 5)	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	-105.0288	(71)
Total internal gains	148.6518	146.1090	141.2110	130.4758	123.9002	117.0270	112.8056	116.2934	120.3827	128.0092	138.3001	147.2792	(72)
	581.4018	595.0850	570.1902	550.4220	522.7697	501.3827	482.3363	483.3432	497.9604	517.6199	548.9875	569.4805	(73)

6. Solar gains													
[Jan]			Area	Solar flux	g	FF	Access	Gains					
			m2	Table 6a	Specific data	Specific data	factor	W					
				W/m2	or Table 6b	or Table 6c	Table 6d						
Northeast			6.2000	11.2829	0.6300	0.7000	0.7700	21.3789	(75)				
Southeast			2.1000	36.7938	0.6300	0.7000	0.7700	23.6138	(77)				
Northwest			4.8000	11.2829	0.6300	0.7000	0.7700	16.5514	(81)				
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843	(83)
Total gains	642.9460	712.5164	764.3300	847.0631	906.2311	904.5916	861.7007	794.4928	727.0531	656.4297	624.9976	620.6648	(84)

7. Mean internal temperature (heating season)

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Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	49.3715	49.5159	49.6583	50.3383	50.4676	51.0783	51.0783	51.1931	50.8413	50.4676	50.2067	49.9368
alpha	4.2914	4.3011	4.3106	4.3559	4.3645	4.4052	4.4052	4.4129	4.3894	4.3645	4.3471	4.3291
util living area	0.9824	0.9714	0.9490	0.8817	0.7513	0.5653	0.4204	0.4720	0.7116	0.9104	0.9693	0.9847 (86)
MIT	19.6482	19.8414	20.1322	20.5342	20.8244	20.9616	20.9916	20.9864	20.8971	20.5289	20.0378	19.6232 (87)
Th 2	20.1173	20.1197	20.1220	20.1328	20.1348	20.1443	20.1443	20.1461	20.1407	20.1348	20.1307	20.1264 (88)
util rest of house	0.9787	0.9654	0.9381	0.8572	0.7051	0.4981	0.3413	0.3888	0.6462	0.8863	0.9619	0.9815 (89)
MIT 2	18.5407	18.7862	19.1522	19.6485	19.9765	20.1182	20.1405	20.1394	20.0616	19.6536	19.0447	18.5155 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	18.7622	18.9973	19.3482	19.8257	20.1461	20.2869	20.3108	20.3088	20.2287	19.8286	19.2433	18.7370 (92)
Temperature adjustment												
adjusted MIT	18.7622	18.9973	19.3482	19.8257	20.1461	20.2869	20.3108	20.3088	20.2287	19.8286	19.2433	18.7370 (93)

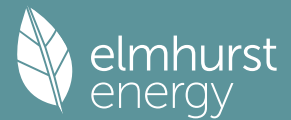
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9710	0.9556	0.9263	0.8473	0.7057	0.5097	0.3569	0.4049	0.6534	0.8762	0.9520	0.9745 (94)
Useful gains	624.3276	680.8667	708.0114	717.7472	639.5256	461.0499	307.5082	321.7277	475.0569	575.1482	595.0050	604.8174 (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	1248.7599	1213.6995	1102.9905	925.2728	713.4514	474.6316	309.7037	325.5031	513.8941	779.5520	1031.0876	1241.0105 (97)
Space heating kWh	464.5776	358.0636	293.8644	149.4184	55.0008	0.0000	0.0000	0.0000	0.0000	152.0765	313.9794	473.3277 (98a)
Space heating requirement - total per year (kWh/year)	2260.3084											
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	464.5776	358.0636	293.8644	149.4184	55.0008	0.0000	0.0000	0.0000	0.0000	152.0765	313.9794	473.3277 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2260.3084											
Space heating per m2	(98c) / (4) = 25.1145 (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	464.5776	358.0636	293.8644	149.4184	55.0008	0.0000	0.0000	0.0000	0.0000	152.0765	313.9794	473.3277 (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)	503.3344	387.9346	318.3796	161.8834	59.5892	0.0000	0.0000	0.0000	0.0000	164.7632	340.1727	512.8144 (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	235.9106	208.5287	221.5667	195.2097	189.4284	170.9326	169.0160	175.6865	177.5380	197.6476	209.7130	233.4172 (64)	
Efficiency of water heater (217)m	85.5506	85.2610	84.6939	83.4678	81.6624	79.8000	79.8000	79.8000	79.8000	83.4791	84.9628	79.8000 (216)	
Fuel for water heating, kWh/month	275.7558	244.5770	261.6087	233.8743	231.9653	214.2013	211.7995	220.1585	222.4788	236.7629	246.8292	272.6482 (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	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	26.6554	21.3840	19.2539	14.1062	10.8960	8.9022	9.9397	12.9200	16.7819	22.0187	24.8701	27.3962 (232)	
Electricity generated by PVs (Appendix M) (negative quantity)	-41.5956	-58.3772	-83.5262	-93.4529	-100.3642	-93.5101	-92.3352	-87.3626	-78.5327	-66.5253	-45.6287	-35.9914 (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)	-24.2933	-51.0198	-101.2614	-151.8885	-200.6563	-201.5699	-199.2147	-168.7675	-123.8136	-72.9151	-32.4173	-19.2182 (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													2448.8715 (211)
Space heating fuel - main system 2													0.0000 (213)
Space heating fuel - secondary													0.0000 (215)
Efficiency of water heater													79.8000
Water heating fuel used													2872.6595 (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)													215.1244 (232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation													-2224.2377 (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													

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Energy saved or generated	-0.0000 (236)
Energy used	0.0000 (237)
Total delivered energy for all uses	3398.4177 (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	2448.8715	0.2100	514.2630 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2872.6595	0.2100	603.2585 (264)
Space and water heating			1117.5215 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	215.1244	0.1443	31.0491 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-877.2021	0.1347	-118.1518
PV Unit electricity exported	-1347.0357	0.1259	-169.6354
Total			-287.7872 (269)
Total CO2, kg/year			872.7127 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.7000 (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	2448.8715	1.1300	2767.2248 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2872.6595	1.1300	3246.1053 (278)
Space and water heating			6013.3301 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	215.1244	1.5338	329.9649 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-877.2021	1.4978	-1313.8762
PV Unit electricity exported	-1347.0357	0.4623	-622.6807
Total			-1936.5569 (283)
Total Primary energy kWh/year			4536.8389 (286)
Target Primary Energy Rate (TPER)			50.4100 (287)

Energy Report

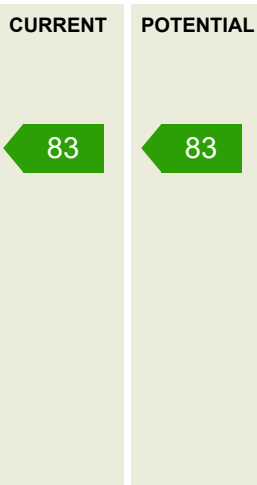
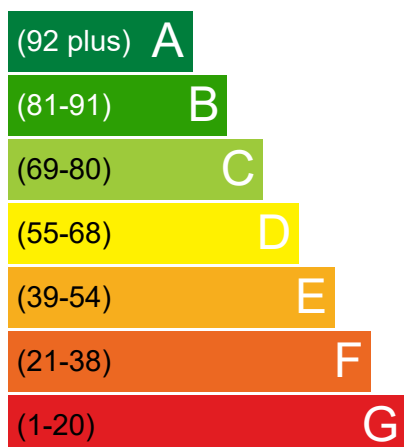
Dwelling Address	
Reference	Block C Flat 9-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	90

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

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

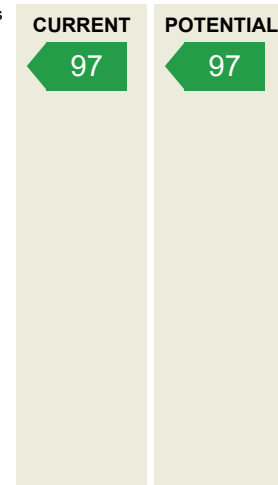
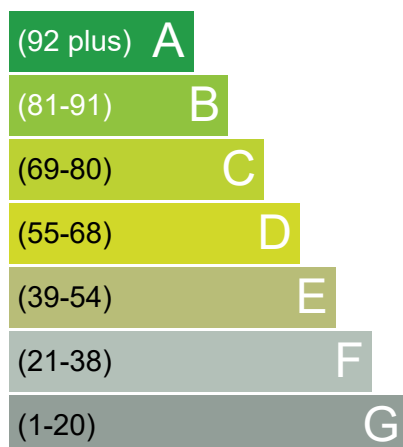
Energy Efficiency Rating

Most energy efficient - lower running costs

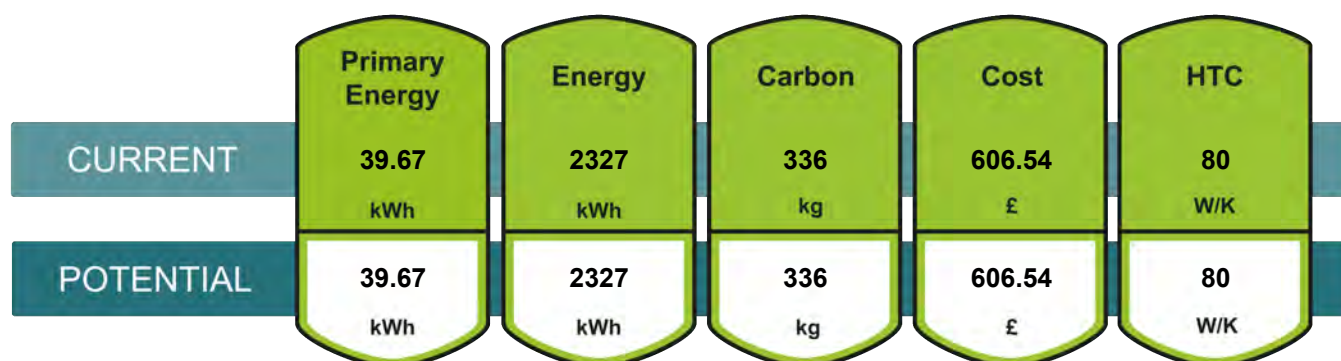


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£67	£67	
Heating		£145	£145	
Hot Water		£395	£395	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£607	£607	

Estimated energy use and potential savings



Space Heating

556

kWh per year



Water Heating

894

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

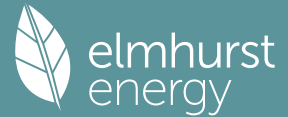
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Full SAP Calculation Printout



Property Reference	Block D Flat 1				Issued on Date	15/04/2025	
Assessment Reference	Be Green			Prop Type Ref			
Property							
SAP Rating	83 B	DER	4.01	TER	9.98		
Environmental	96 A	% DER < TER				59.82	
CO ₂ Emissions (t/year)	0.34	DFEE	31.35	TFEE	33.41		
Compliance Check	See BREL	% DFEE < TFEE				6.17	
% DPER < TPER	18.46	DPER	42.39	TPER	51.98		
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001	
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	93.0000 (1b)	2.6000 (2b)	241.8000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		241.8000 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	241.8000 (5)

2. Ventilation rate

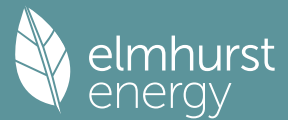
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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											
Opening Type 1			13.1000	1.3258	17.3674			(27)			
Heatloss Floor 1			93.0000	0.1300	12.0900	110.0000	10230.0000	(28a)			
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860	190.0000	13812.9994	(29a)			
Total net area of external elements Aum(A, m2)			178.8000					(31)			
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	42.5434			(33)			
Main dwelling											
Party Ceiling 1			93.0000			20.0000	1860.0000	(32b)			
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		25902.9994	(34)			
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							278.5269	(35)			
List of Thermal Bridges											
K1 Element				Length	Psi-value	Total					
E5 Ground floor (normal)				28.0000	0.0000	0.0000					
E16 Corner (normal)				10.4000	0.0000	0.0000					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000	(36)			
Point Thermal bridges						(36a) =	0.0000				
Total fabric heat loss					(33) + (36) + (36a) =		42.5434	(37)			
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	41.7714	41.6986	41.6273	41.2922	41.2295	40.9376	40.9376	40.8836	41.0500	41.2295	41.3563	41.4889 (38)
Heat transfer coeff	84.3148	84.2420	84.1707	83.8356	83.7729	83.4810	83.4810	83.4270	83.5934	83.7729	83.8997	84.0323 (39)
Average = Sum(39)m / 12 =												83.8353
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9066	0.9058	0.9051	0.9015	0.9008	0.8976	0.8976	0.8971	0.8989	0.9008	0.9021	0.9036 (40)
HLP (average)												0.9015
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6646 (42)
Hot water usage for mixer showers												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths												
	29.0877	28.6486	28.0239	27.0884	26.2454	25.0848	24.2043	25.2810	25.8461	26.9960	28.1916	29.0646 (42b)
Hot water usage for other uses												
	41.9181	40.3938	38.8695	37.3453	35.8210	34.2967	34.2967	35.8210	37.3453	38.8695	40.3938	41.9181 (42c)
Average daily hot water use (litres/day)												65.0786 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	71.0058	69.0424	66.8935	64.4337	62.0663	59.3815	58.5010	61.1019	63.1913	65.8656	68.5854	70.9827 (44)
Energy conte	104.5328	91.3571	95.5894	84.1665	79.9787	68.6727	64.6453	71.9181	73.2988	84.8744	92.6955	104.2433 (45)
Energy content (annual)												Total = Sum(45)m = 1015.9726
Distribution loss (46)m = 0.15 x (45)m												
	15.6799	13.7036	14.3384	12.6250	11.9968	10.3009	9.6968	10.7877	10.9948	12.7312	13.9043	15.6365 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss												
	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage												
	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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												
	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (64)
Total per year (kWh/year)												1656.4746 (64)
Electric shower(s)												1656 (64)
	55.1745	49.1609	53.6818	51.2279	52.1892	49.7834	51.4428	52.1892	51.2279	53.6818	52.6724	55.1745 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												627.6062 (64a)
Heat gains from water heating, kWh/month												
	92.0698	81.9740	88.7230	82.9075	83.1593	77.3947	77.8743	80.4791	79.2940	85.1602	86.1046	91.9736 (65)

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

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	132.1206	146.2764	132.1206	136.5246	132.1206	136.5246	132.1206	132.1206	136.5246	132.1206	136.5246	132.1206 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	244.4900	247.0270	240.6338	227.0233	209.8424	193.6949	182.9074	180.3703	186.7636	200.3741	217.5549	233.7024 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230 (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)												
	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839 (71)
Water heating gains (Table 5)												
	123.7497	121.9851	119.2513	115.1494	111.7732	107.4927	104.6698	108.1708	110.1306	114.4627	119.5897	123.6204 (72)
Total internal gains												
	563.3293	578.2574	554.9746	541.6662	516.7052	500.6811	482.6667	483.6307	496.3877	509.9263	536.6381	552.4124 (73)

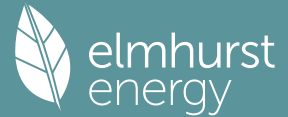
6. Solar gains

[Jan]												Gains
				Area	Solar flux		g	FF		Access		W
				m2	Table 6a		Specific data	Specific data		factor		
					W/m2		or Table 6b	or Table 6c		Table 6d		
Northeast				6.2000		11.2829	0.3500		0.0000	0.7700		18.8527 (75)
Southeast				2.1000		36.7938	0.3500		0.0000	0.7700		20.8235 (77)
Northwest				4.8000		11.2829	0.3500		0.0000	0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	617.6010	681.8124	726.1737	803.2544	854.8545	856.2445	817.2032	758.0131	698.4094	632.3335	603.6664	597.5485 (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	85.3382	85.4120	85.4844	85.8261	85.8903	86.1906	86.1906	86.2464	86.0747	85.8903	85.7605	85.6251
alpha	6.6892	6.6941	6.6990	6.7217	6.7260	6.7460	6.7460	6.7498	6.7383	6.7260	6.7174	6.7083
util living area												
	0.9977	0.9950	0.9873	0.9481	0.8268	0.6140	0.4484	0.5037	0.7746	0.9653	0.9942	0.9982 (86)

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Living	20.1273	20.2528	20.4449	20.7211	20.9203	20.9905	20.9990	20.9979	20.9605	20.7122	20.3757	20.1010
Non living	19.1413	19.3018	19.5457	19.8861	20.1030	20.1646	20.1692	20.1693	20.1436	19.8818	19.4615	19.1097
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	20.5536	20.2528	20.4449	20.7211	20.9203	20.9905	20.9990	20.9979	20.9605	20.7122	20.3757	20.2268 (87)
Th 2	20.1619	20.1625	20.1632	20.1663	20.1668	20.1695	20.1695	20.1700	20.1685	20.1668	20.1657	20.1645 (88)
util rest of house												
	0.9969	0.9932	0.9826	0.9295	0.7770	0.5389	0.3644	0.4143	0.7012	0.9490	0.9917	0.9976 (89)
MIT 2	19.7550	19.3018	19.5457	19.8861	20.1030	20.1646	20.1692	20.1693	20.1436	19.8818	19.4615	19.2998 (90)
Living area fraction												
MIT	19.8924	19.4654	19.7004	20.0298	20.2436	20.3067	20.3120	20.3119	20.2841	20.0246	19.6188	19.4593 (92)
Temperature adjustment												0.0000
adjusted MIT	19.8924	19.4654	19.7004	20.0298	20.2436	20.3067	20.3120	20.3119	20.2841	20.0246	19.6188	19.4593 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9966	0.9912	0.9792	0.9259	0.7820	0.5516	0.3789	0.4297	0.7121	0.9455	0.9896	0.9968 (94)
Useful gains	615.5036	675.8163	711.0359	743.6978	668.4801	472.3070	309.6009	325.7242	497.3530	597.8494	597.3592	595.6404 (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	1314.6693	1227.0207	1111.0856	933.0710	715.7249	476.3987	309.8784	326.3544	516.9519	789.5290	1050.3243	1282.2703 (97)
Space heating kWh	520.1792	370.4094	297.6370	136.3487	35.1501	0.0000	0.0000	0.0000	0.0000	142.6096	326.1348	510.8526 (98a)
Space heating requirement - total per year (kWh/year)												2339.3215
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	520.1792	370.4094	297.6370	136.3487	35.1501	0.0000	0.0000	0.0000	0.0000	142.6096	326.1348	510.8526 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2339.3215
Space heating per m2										(98c) / (4) =		25.1540 (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 %)												302.9509 (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	520.1792	370.4094	297.6370	136.3487	35.1501	0.0000	0.0000	0.0000	0.0000	142.6096	326.1348	510.8526 (98)
Space heating efficiency (main heating system 1)	302.9509	302.9509	302.9509	302.9509	302.9509	0.0000	0.0000	0.0000	0.0000	302.9509	302.9509	302.9509 (210)
Space heating fuel (main heating system)	171.7041	122.2671	98.2459	45.0069	11.6026	0.0000	0.0000	0.0000	0.0000	47.0735	107.6527	168.6255 (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	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (64)
Efficiency of water heater (217)m	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000 (216)
Fuel for water heating, kWh/month	86.2821	76.2712	81.4268	74.2728	72.9520	65.8614	64.6276	68.5760	68.3728	75.6098	78.9031	86.1249 (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	32.8170	26.3270	23.7045	17.3670	13.4147	10.9600	12.2374	15.9066	20.6611	27.1085	30.6190	33.7291 (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												772.1783 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												184.2000
Water heating fuel used												899.2805 (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)												264.8519 (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												2563.9168 (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	772.1783	0.1563	120.6932 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	899.2805	0.1405	126.3110 (264)
Energy for instantaneous electric shower(s)	627.6062	0.1391	87.3139 (264a)
Space and water heating			247.0042 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	264.8519	0.1443	38.2263 (268)
Total CO2, kg/year			372.5444 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.0100 (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	772.1783	1.5787	1219.0015 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	899.2805	1.5193	1366.3119 (278)
Energy for instantaneous electric shower(s)	627.6062	1.5143	950.4055 (278a)
Space and water heating			2585.3134 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	264.8519	1.5338	406.2386 (282)
Total Primary energy kWh/year			3941.9575 (286)
Dwelling Primary energy Rate (DPER)			42.3900 (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	93.0000 (1b)	x 2.6000 (2b)	= 241.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	241.8000 (5)

2. Ventilation rate

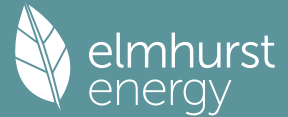
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1241 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3741 (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) = 0.3180 (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	0.4054	0.3974	0.3895	0.3498	0.3418	0.3021	0.3021	0.2941	0.3180	0.3418	0.3577	0.3736 (22b)
Effective ac	0.5822	0.5790	0.5759	0.5612	0.5584	0.5456	0.5456	0.5433	0.5505	0.5584	0.5640	0.5698 (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 Opening Type			13.1000	1.1450	15.0000		(27)
Heatloss Floor 1			93.0000	0.1300	12.0900		(28a)
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860		(29a)
Total net area of external elements Aum(A, m2)			178.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	40.1760		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							288.5269 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000 0.0900 0.9360

5.4160 (36)
0.0000
(33) + (36) + (36a) = 45.5920 (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	46.4540	46.1994	45.9498	44.7775	44.5582	43.5372	43.5372	43.3482	43.9305	44.5582	45.0019	45.4658 (38)
Heat transfer coeff	92.0460	91.7914	91.5418	90.3695	90.1502	89.1292	89.1292	88.9402	89.5225	90.1502	90.5939	91.0578 (39)
Average = Sum(39)m / 12 =												90.3685

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9897	0.9870	0.9843	0.9717	0.9694	0.9584	0.9584	0.9563	0.9626	0.9694	0.9741	0.9791 (40)
HLP (average)												0.9717
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6646 (42)

Hot water usage for mixer showers 68.8963 67.8609 66.3522 63.4655 61.3351 58.9594 57.6091 59.1064 60.7477 63.2985 66.2473 68.6323 (42a)

Hot water usage for baths 29.7509 29.3090 28.6868 27.5396 26.6806 25.7280 25.2135 25.8314 26.5041 27.5233 28.6942 29.6503 (42b)

Hot water usage for other uses 41.9181 40.3938 38.8695 37.3453 35.8210 34.2967 34.2967 35.8210 37.3453 38.8695 40.3938 41.9181 (42c)

Average daily hot water use (litres/day) 129.2112 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	140.5653	137.5638	133.9086	128.3503	123.8366	118.9841	117.1192	120.7587	124.5971	129.6914	135.3353	140.2008 (44)
Energy conte	222.6211	195.8890	205.8125	175.7052	166.7079	146.3048	141.6456	149.5245	153.6407	175.9900	192.8100	219.5205 (45)
Energy content (annual)										Total = Sum(45)m =		2146.1718
Distribution loss (46)m = 0.15 x (45)m	33.3932	29.3834	30.8719	26.3558	25.0062	21.9457	21.2468	22.4287	23.0461	26.3985	28.9215	32.9281 (46)
Water storage loss:												150.0000 (47)
Store volume												1.3938 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.7527 (55)
Enter (49) or (54) in (55)												
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (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	269.2160	237.9747	252.4074	220.7970	213.3028	191.3967	188.2405	196.1194	198.7325	222.5849	237.9018	266.1154 (62)
WWHRS	-31.4965	-27.8558	-29.1690	-24.1531	-22.5098	-19.2618	-18.0548	-19.1995	-19.9290	-23.4941	-26.6159	-30.9132 (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	237.7195	210.1190	223.2384	196.6439	190.7931	172.1349	170.1856	176.9199	178.8035	199.0909	211.2859	235.2022 (64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				2402.1368 (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	111.2974	98.8017	105.7086	94.4954	92.7063	84.7198	84.3731	86.9928	87.1590	95.7926	100.1828	110.2665 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	132.1206	146.2764	132.1206	136.5246	132.1206	136.5246	132.1206	132.1206	136.5246	132.1206	136.5246	132.1206 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	244.4900	247.0270	240.6338	227.0233	209.8424	193.6949	182.9074	180.3703	186.7636	200.3741	217.5549	233.7024 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839 (71)
Water heating gains (Table 5)	149.5933	147.0263	142.0814	131.2437	124.6053	117.6664	113.4047	116.9258	121.0542	128.7535	139.1428	148.2077 (72)
Total internal gains	592.1729	606.2986	580.8047	560.7605	532.5373	510.8549	491.4016	492.3857	507.3113	527.2171	559.1912	579.9996 (73)

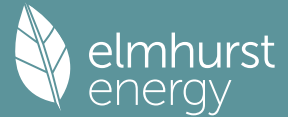
6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Northeast	6.2000	11.2829	0.6300	0.7000	0.7700	21.3789 (75)
Southeast	2.1000	36.7938	0.6300	0.7000	0.7700	23.6138 (77)
Northwest	4.8000	11.2829	0.6300	0.7000	0.7700	16.5514 (81)
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089
Total gains	653.7170	723.7300	774.9445	857.4016	915.9986	914.0638
						870.7660
						803.5353
						736.4039
						666.0269
						635.2013
						631.1840 (84)

7. Mean internal temperature (heating season)

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

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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	80.9771	81.2017	81.4231	82.4792	82.6799	83.6270	83.6270	83.8048	83.2596	82.6799	82.2750	81.8559	
alpha	6.3985	6.4134	6.4282	6.4986	6.5120	6.5751	6.5751	6.5870	6.5506	6.5120	6.4850	6.4571	
util living area	0.9976	0.9947	0.9867	0.9470	0.8256	0.6132	0.4491	0.5062	0.7806	0.9662	0.9941	0.9981	(86)
MIT	20.0664	20.2001	20.4058	20.7021	20.9130	20.9895	20.9988	20.9975	20.9546	20.6887	20.3360	20.0491	(87)
Th 2	20.0919	20.0942	20.0964	20.1070	20.1089	20.1182	20.1182	20.1199	20.1146	20.1089	20.1049	20.1008	(88)
util rest of house	0.9967	0.9928	0.9815	0.9271	0.7727	0.5338	0.3598	0.4110	0.7033	0.9493	0.9915	0.9973	(89)
MIT 2	19.0062	19.1784	19.4406	19.8112	20.0407	20.1129	20.1178	20.1191	20.0867	19.8033	19.3607	18.9910	(90)
Living area fraction									FLA = Living area /	(4) =		0.1720	(91)
MIT	19.1886	19.3542	19.6067	19.9645	20.1908	20.2637	20.2694	20.2702	20.2360	19.9557	19.5285	19.1730	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1886	19.3542	19.6067	19.9645	20.1908	20.2637	20.2694	20.2702	20.2360	19.9557	19.5285	19.1730	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9954	0.9906	0.9778	0.9233	0.7780	0.5472	0.3752	0.4275	0.7147	0.9456	0.9892	0.9963	(94)
Useful gains	650.7054	716.9087	757.7536	791.6519	712.6743	500.1904	326.7237	343.4778	526.3391	629.7749	628.3455	628.8296	(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	1370.4349	1326.7699	1199.8076	999.8896	765.4462	504.7989	327.0503	344.2183	549.3092	843.4147	1125.9477	1363.4103	(97)
Space heating kWh	535.4787	409.8268	328.8881	149.9311	39.2623	0.0000	0.0000	0.0000	0.0000	158.9480	358.2736	546.5280	(98a)
Space heating requirement - total per year (kWh/year)												2527.1367	
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	535.4787	409.8268	328.8881	149.9311	39.2623	0.0000	0.0000	0.0000	0.0000	158.9480	358.2736	546.5280	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2527.1367	
Space heating per m2										(98c) / (4) =		27.1735	(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	535.4787	409.8268	328.8881	149.9311	39.2623	0.0000	0.0000	0.0000	0.0000	158.9480	358.2736	546.5280	(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)	580.1503	444.0160	356.3252	162.4389	42.5377	0.0000	0.0000	0.0000	0.0000	172.2080	388.1621	592.1214	(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	237.7195	210.1190	223.2384	196.6439	190.7931	172.1349	170.1856	176.9199	178.8035	199.0909	211.2859	235.2022	(64)	
Efficiency of water heater (217)m	85.8241	85.5306	84.9273	83.4593	81.2046	79.8000	79.8000	79.8000	79.8000	83.5597	85.2340	79.8000	(216)	
Fuel for water heating, kWh/month	276.9847	245.6654	262.8583	235.6166	234.9535	215.7079	213.2652	221.7041	224.0646	238.2619	247.8893	273.8551	(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	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	27.4520	22.0231	19.8293	14.5278	11.2217	9.1682	10.2368	13.3062	17.2834	22.6768	25.6134	28.2150	(232)	
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-42.8679	-60.1031	-85.9077	-96.0115	-103.0178	-95.9434	-94.7345	-89.6785	-80.6867	-68.4414	-47.0020	-37.0990	(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	-25.2173	-52.9405	-105.0395	-157.5079	-208.0367	-208.9726	-206.5338	-174.9893	-128.4045	-75.6471	-33.6456	-19.9509	(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												2737.9596	(211)	
Space heating fuel - main system 2												0.0000	(213)	
Space heating fuel - secondary												0.0000	(215)	
Efficiency of water heater												79.8000		
Water heating fuel used												2890.8265	(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)												221.5538	(232)	
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation												-2298.3790	(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

3637.9608 (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	2737.9596	0.2100	574.9715 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2890.8265	0.2100	607.0736 (264)
Space and water heating			1182.0451 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	221.5538	0.1443	31.9771 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	0.1347	-121.4448
PV Unit electricity exported	-1396.8855	0.1259	-175.9251
Total			-297.3699 (269)
Total CO2, kg/year			928.5815 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.9800 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2737.9596	1.1300	3093.8943 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2890.8265	1.1300	3266.6339 (278)
Space and water heating			6360.5282 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	221.5538	1.5338	339.8266 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	1.4979	-1350.3395
PV Unit electricity exported	-1396.8855	0.4623	-645.7684
Total			-1996.1080 (283)
Total Primary energy kWh/year			4834.3476 (286)
Target Primary Energy Rate (TPER)			51.9800 (287)

Energy Report



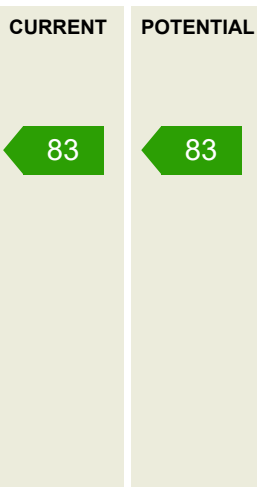
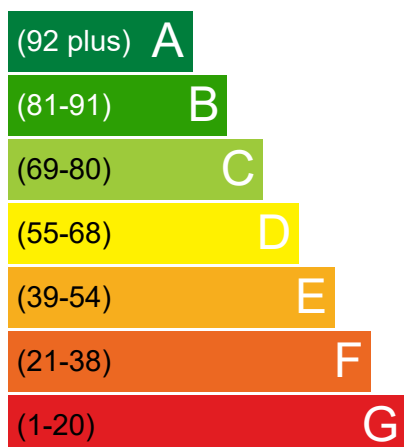
Dwelling Address	
Reference	Block D Flat 1-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	93

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

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

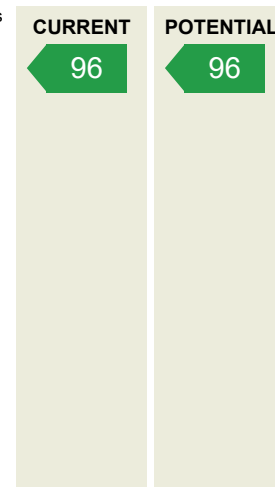
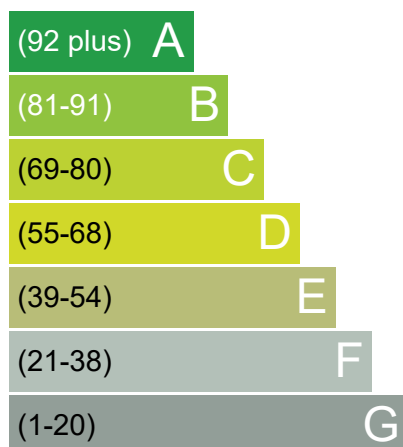
Energy Efficiency Rating

Most energy efficient - lower running costs

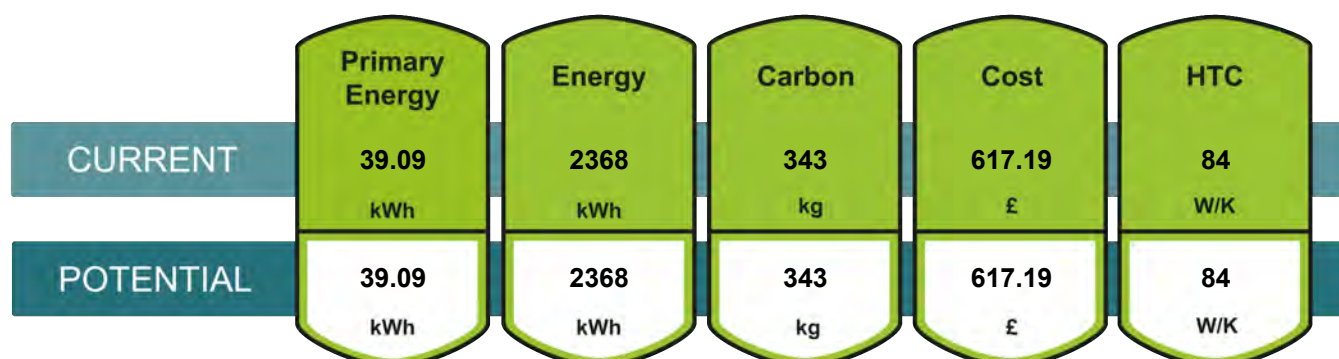


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£69	£69	
Heating		£150	£150	
Hot Water		£398	£398	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£617	£617	

Estimated energy use and potential savings



Space Heating

577
kWh per year



Water Heating

899
kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

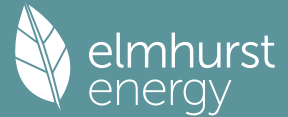
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block D Flat 2				Issued on Date	15/04/2025		
Assessment Reference	Be Green			Prop Type Ref				
Property								
SAP Rating	83 B		DER	4.51		TER	11.34	
Environmental	97 A		% DER < TER				60.23	
CO ₂ Emissions (t/year)	0.26		DFEE	28.31		TFEE	31.15	
Compliance Check	See BREL		% DFEE < TFEE				9.12	
% DPER < TPER	18.87		DPER	48.01		TPER	59.18	
Assessor Details	Mr. Joe Mountain					Assessor ID	AV71-0001	
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	62.0000 (1b)	2.6000 (2b)	161.2000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	161.2000 (5)

2. Ventilation rate

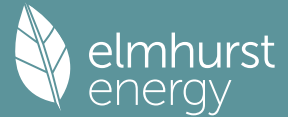
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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											
Opening Type 1			13.1000	1.3258	17.3674			(27)			
Heatloss Floor 1			62.0000	0.1300	8.0600	110.0000	6820.0000	(28a)			
External Wall 1	26.0000	13.1000	12.9000	0.1800	2.3220	190.0000	2450.9998	(29a)			
Total net area of external elements Aum(A, m2)			88.0000					(31)			
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.7494			(33)			
Main dwelling											
Party Ceiling 1			62.0000			20.0000	1240.0000	(32b)			
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		10510.9998	(34)			
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							169.5323	(35)			
List of Thermal Bridges											
K1 Element				Length	Psi-value	Total					
E5 Ground floor (normal)				28.0000	0.0000	0.0000					
E16 Corner (normal)				10.4000	0.0000	0.0000					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000	(36)			
Point Thermal bridges						(36a) =	0.0000				
Total fabric heat loss					(33) + (36) + (36a) =		27.7494	(37)			
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	27.8476	27.7991	27.7515	27.5281	27.4863	27.2917	27.2917	27.2557	27.3667	27.4863	27.5709	27.6593 (38)
Heat transfer coeff	55.5970	55.5485	55.5009	55.2775	55.2357	55.0412	55.0412	55.0051	55.1161	55.2357	55.3203	55.4087 (39)
Average = Sum(39)m / 12 =												55.2773
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.8967	0.8959	0.8952	0.8916	0.8909	0.8878	0.8878	0.8872	0.8890	0.8909	0.8923	0.8937 (40)
HLP (average)												0.8916
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0376 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	24.6674	24.2951	23.7653	22.9720	22.2571	21.2729	20.5262	21.4392	21.9184	22.8936	23.9075	24.6479 (42b)
Hot water usage for other uses	35.4969	34.2061	32.9153	31.6245	30.3337	29.0429	29.0429	30.3337	31.6245	32.9153	34.2061	35.4969 (42c)
Average daily hot water use (litres/day)												55.1424 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	60.1643	58.5011	56.6806	54.5965	52.5907	50.3157	49.5691	51.7729	53.5429	55.8089	58.1136	60.1447 (44)
Energy conte	88.5722	77.4088	80.9954	71.3167	67.7685	58.1885	54.7753	60.9377	62.1071	71.9154	78.5425	88.3270 (45)
Energy content (annual)										Total = Sum(45)m =		860.8551
Distribution loss (46)m = 0.15 x (45)m	13.2858	11.6113	12.1493	10.6975	10.1653	8.7283	8.2163	9.1407	9.3161	10.7873	11.7814	13.2490 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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	142.9710	126.5432	135.3942	123.9607	122.1673	110.8325	109.1741	115.3365	114.7511	126.3142	131.1865	142.7258 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	142.9710	126.5432	135.3942	123.9607	122.1673	110.8325	109.1741	115.3365	114.7511	126.3142	131.1865	142.7258 (64)
								Total per year (kWh/year) = Sum(64)m =				1501.3571 (64)
12Total per year (kWh/year)												1501 (64)
Electric shower(s)	46.7551	41.6592	45.4903	43.4108	44.2254	42.1867	43.5930	44.2254	43.4108	45.4903	44.6349	46.7551 (64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				531.8370 (64a)
Heat gains from water heating, kWh/month	84.6581	75.4608	81.8226	76.6807	77.1084	72.0096	72.6301	74.8372	73.6185	78.8035	79.3893	84.5765 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	89.9699	99.6095	89.9699	92.9689	89.9699	92.9689	89.9699	89.9699	92.9689	89.9699	92.9689	89.9699 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	177.9613	179.8080	175.1544	165.2475	152.7418	140.9882	133.1361	131.2894	135.9430	145.8499	158.3556	170.1092 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879 (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)	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032 (71)
Water heating gains (Table 5)	113.7878	112.2928	109.9766	106.5010	103.6403	100.0133	97.6210	100.5876	102.2479	105.9187	110.2629	113.6781 (72)
Total internal gains	435.2827	445.2740	428.6646	418.2811	399.9157	387.5341	374.2907	375.4106	384.7235	395.3021	415.1511	427.3209 (73)

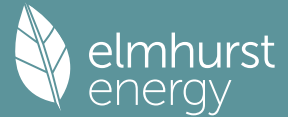
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	489.5544	548.8290	599.8637	679.8693	738.0651	743.0975	708.8272	649.7929	586.7452	517.7093	482.1794	472.4570	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	52.5158	52.5617	52.6067	52.8193	52.8593	53.0462	53.0462	53.0809	52.9740	52.8593	52.7785	52.6943
alpha	4.5011	4.5041	4.5071	4.5213	4.5240	4.5364	4.5364	4.5387	4.5316	4.5240	4.5186	4.5130
util living area	0.9727	0.9540	0.9155	0.8121	0.6485	0.4655	0.3399	0.3861	0.6130	0.8588	0.9510	0.9764 (86)

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Living	19.8819	20.0834	20.3680	20.7111	20.9132	20.9842	20.9970	20.9947	20.9489	20.6785	20.2318	19.8383
Non living	18.8736	19.1257	19.4769	19.8828	20.0998	20.1674	20.1766	20.1759	20.1392	19.8562	19.3170	18.8206
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	20.4280	20.0834	20.3680	20.7111	20.9132	20.9842	20.9970	20.9947	20.9489	20.6785	20.2318	20.0008 (87)
Th 2	20.1703	20.1709	20.1716	20.1747	20.1752	20.1779	20.1779	20.1784	20.1769	20.1752	20.1741	20.1729 (88)
util rest of house												
MIT 2	0.9673	0.9454	0.9000	0.7816	0.6021	0.4087	0.2772	0.3186	0.5506	0.8276	0.9403	0.9717 (89)
Living area fraction	19.6533	19.1257	19.4769	19.8828	20.0998	20.1674	20.1766	20.1759	20.1392	19.8562	19.3170	19.0643 (90)
MIT	20.0157	19.5737	19.8937	20.2703	20.4803	20.5495	20.5603	20.5589	20.5179	20.2408	19.7449	19.5023 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0157	19.5737	19.8937	20.2703	20.4803	20.5495	20.5603	20.5589	20.5179	20.2408	19.7449	19.5023 (93)

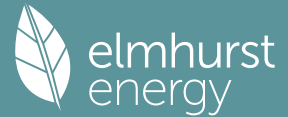
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9662	0.9380	0.8941	0.7853	0.6197	0.4346	0.3065	0.3500	0.5771	0.8303	0.9337	0.9671	(94)
Useful gains	473.0009	514.7784	536.3176	533.9197	457.3908	322.9677	217.2612	227.4569	338.6325	429.8667	450.1885	456.8967	(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	873.7456	815.0995	743.3611	628.5194	484.9851	327.4665	217.9794	228.7583	353.7309	532.5184	699.5185	847.8815	(97)
Space heating kWh	298.1540	201.8158	154.0404	68.1118	20.5302	0.0000	0.0000	0.0000	0.0000	76.3728	179.5176	290.8927	(98a)
Space heating requirement - total per year (kWh/year)												1289.4353	
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	298.1540	201.8158	154.0404	68.1118	20.5302	0.0000	0.0000	0.0000	0.0000	76.3728	179.5176	290.8927	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1289.4353	
Space heating per m2										(98c) / (4) =		20.7973	(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 %)													302.2825 (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	298.1540	201.8158	154.0404	68.1118	20.5302	0.0000	0.0000	0.0000	0.0000	76.3728	179.5176	290.8927	(98)
Space heating efficiency (main heating system 1)	302.2825	302.2825	302.2825	302.2825	302.2825	0.0000	0.0000	0.0000	0.0000	302.2825	302.2825	302.2825	(210)
Space heating fuel (main heating system)	98.6342	66.7640	50.9591	22.5325	6.7917	0.0000	0.0000	0.0000	0.0000	25.2654	59.3873	96.2321	(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	142.9710	126.5432	135.3942	123.9607	122.1673	110.8325	109.1741	115.3365	114.7511	126.3142	131.1865	142.7258	(64)
Efficiency of water heater (217)m	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	(216)
Fuel for water heating, kWh/month	77.7949	68.8560	73.6721	67.4508	66.4750	60.3073	59.4049	62.7581	62.4396	68.7314	71.3826	77.6614	(219)
Space cooling fuel requirement													
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(231)
Lighting	20.7574	16.6524	14.9936	10.9850	8.4851	6.9324	7.7404	10.0613	13.0686	17.1467	19.3672	21.3343	(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												426.5663	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												183.7795	
Water heating fuel used												816.9341	(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)												167.5244	(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												1942.8618	(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	426.5663	0.1565	66.7644 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	816.9341	0.1403	114.6519 (264)
Energy for instantaneous electric shower(s)	531.8370	0.1391	73.9903 (264a)
Space and water heating			181.4164 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	167.5244	0.1443	24.1789 (268)
Total CO2, kg/year			279.5856 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5100 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	426.5663	1.5794	673.7257 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	816.9341	1.5189	1240.8519 (278)
Energy for instantaneous electric shower(s)	531.8370	1.5143	805.3790 (278a)
Space and water heating			1914.5776 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	167.5244	1.5338	256.9545 (282)
Total Primary energy kWh/year			2976.9111 (286)
Dwelling Primary energy Rate (DPER)			48.0100 (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	62.0000 (1b)	x 2.6000 (2b)	= 161.2000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 161.2000 (5)

2. Ventilation rate

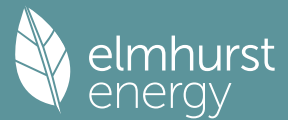
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1241 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3741 (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) = 0.3180 (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	0.4054	0.3974	0.3895	0.3498	0.3418	0.3021	0.3021	0.2941	0.3180	0.3418	0.3577	0.3736 (22b)
Effective ac	0.5822	0.5790	0.5759	0.5612	0.5584	0.5456	0.5456	0.5433	0.5505	0.5584	0.5640	0.5698 (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 Opening Type			13.1000	1.1450	15.0000		(27)
Heatloss Floor 1			62.0000	0.1300	8.0600		(28a)
External Wall 1	26.0000	13.1000	12.9000	0.1800	2.3220		(29a)
Total net area of external elements Aum (A, m2)			88.0000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	25.3820		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							179.5323 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000
0.0900
0.9360
5.4160 (36)
0.0000
(33) + (36) + (36a) = 30.7980 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	30.9693	30.7996	30.6332	29.8517	29.7055	29.0248	29.0248	28.8988	29.2870	29.7055	30.0013	30.3105 (38)
Average = Sum(39)m / 12 =	61.7673	61.5976	61.4312	60.6497	60.5035	59.8228	59.8228	59.6968	60.0850	60.5035	60.7993	61.1085 (39)
												60.6490
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.9962	0.9935	0.9908	0.9782	0.9759	0.9649	0.9649	0.9629	0.9691	0.9759	0.9806	0.9856 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0376 (42)
Hot water usage for mixer showers												
	58.3831	57.5057	56.2272	53.7810	51.9757	49.9625	48.8182	50.0871	51.4780	53.6395	56.1383	58.1594 (42a)
Hot water usage for baths												
	25.2299	24.8552	24.3275	23.3546	22.6261	21.8183	21.3820	21.9060	22.4765	23.3408	24.3338	25.1446 (42b)
Hot water usage for other uses												
	35.4969	34.2061	32.9153	31.6245	30.3337	29.0429	29.0429	30.3337	31.6245	32.9153	34.2061	35.4969 (42c)
Average daily hot water use (litres/day)												109.4892 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
	119.1099	116.5670	113.4700	108.7601	104.9355	100.8238	99.2431	102.3267	105.5789	109.8956	114.6781	118.8009 (44)
Energy content (annual)												
	188.6409	165.9898	174.3992	148.8871	141.2634	123.9746	120.0260	126.7019	130.1894	149.1274	163.3800	186.0135 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 1818.5931
	28.2961	24.8985	26.1599	22.3331	21.1895	18.5962	18.0039	19.0053	19.5284	22.3691	24.5070	27.9020 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.7527 (55)
Total storage loss												
	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)
If cylinder contains dedicated solar storage												
	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (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												
	235.2358	208.0755	220.9941	193.9790	187.8583	169.0664	166.6209	173.2968	175.2812	195.7223	208.4719	232.6084 (62)
WWHRS												
	-26.6903	-23.6051	-24.7179	-20.4674	-19.0749	-16.3225	-15.2998	-16.2698	-16.8879	-19.9090	-22.5545	-26.1961 (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												
	208.5455	184.4704	196.2761	173.5115	168.7834	152.7439	151.3211	157.0270	158.3933	175.8133	185.9174	206.4123 (64)
Total per year (kWh/year)												2119.2152 (64)
Electric shower(s)												2119 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
	99.9990	88.8602	95.2636	85.5784	84.2460	77.2950	77.1846	79.4043	79.3614	86.8608	90.3973	99.1254 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	89.9699	99.6095	89.9699	92.9689	89.9699	92.9689	89.9699	89.9699	92.9689	89.9699	92.9689	89.9699 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	177.9613	179.8080	175.1544	165.2475	152.7418	140.9882	133.1361	131.2894	135.9430	145.8499	158.3556	170.1092 (68)
Pumps, fans	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032 (71)
Total internal gains	134.4073	132.2324	128.0425	118.8589	113.2339	107.3542	103.7427	106.7262	110.2242	116.7483	125.5519	133.2331 (72)
	458.9022	468.2136	449.7305	433.6390	412.5093	394.8750	380.4124	381.5492	392.6998	409.1318	433.4400	449.8758 (73)

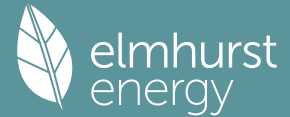
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d			Gains W	
Northeast				6.2000	11.2829	0.6300	0.7000	0.7700			21.3789 (75)	
Southeast				2.1000	36.7938	0.6300	0.7000	0.7700			23.6138 (77)	
Northwest				4.8000	11.2829	0.6300	0.7000	0.7700			16.5514 (81)	
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843 (83)
Total gains	520.4464	585.6450	643.8703	730.2801	795.9706	798.0839	759.7767	692.6988	621.7924	547.9416	509.4501	501.0602 (84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	50.0579	50.1959	50.3318	50.9804	51.1036	51.6850	51.6850	51.7942	51.4595	51.1036	50.8550	50.5976
alpha	4.3372	4.3464	4.3555	4.3987	4.4069	4.4457	4.4457	4.4529	4.4306	4.4069	4.3903	4.3732
util living area	0.9738	0.9559	0.9182	0.8168	0.6538	0.4700	0.3444	0.3925	0.6253	0.8667	0.9539	0.9773 (86)
MIT	19.7891	20.0025	20.3078	20.6815	20.9020	20.9820	20.9964	20.9937	20.9401	20.6420	20.1680	19.7576 (87)
Th 2	20.0865	20.0887	20.0910	20.1015	20.1035	20.1127	20.1127	20.1144	20.1092	20.1035	20.0995	20.0953 (88)
util rest of house	0.9683	0.9468	0.9018	0.7842	0.6036	0.4084	0.2759	0.3187	0.5576	0.8341	0.9430	0.9724 (89)
MIT 2	18.6912	18.9594	19.3370	19.7842	20.0203	20.1013	20.1112	20.1116	20.0663	19.7525	19.1781	18.6580 (90)
Living area fraction									FLA = Living area / (4) =			0.4677 (91)
MIT	19.2047	19.4473	19.7910	20.2039	20.4327	20.5132	20.5252	20.5242	20.4750	20.1686	19.6411	19.1723 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2047	19.4473	19.7910	20.2039	20.4327	20.5132	20.5252	20.5242	20.4750	20.1686	19.6411	19.1723 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9615	0.9392	0.8956	0.7882	0.6226	0.4365	0.3079	0.3531	0.5862	0.8367	0.9362	0.9662 (94)
Useful gains	500.4296	550.0336	576.6503	575.5747	495.5947	348.3912	233.9405	244.6096	364.5158	458.4886	476.9703	484.1085 (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	920.6234	896.0801	816.4842	685.5773	528.3599	353.7447	234.8191	246.2004	383.0428	578.9307	762.4902	914.9369 (97)
Space heating kWh	312.6242	232.5432	178.4364	79.2019	24.3773	0.0000	0.0000	0.0000	0.0000	89.6089	205.5743	320.5363 (98a)
Space heating requirement - total per year (kWh/year)												1442.9027
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	312.6242	232.5432	178.4364	79.2019	24.3773	0.0000	0.0000	0.0000	0.0000	89.6089	205.5743	320.5363 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1442.9027
Space heating per m2										(98c) / (4) =		23.2726 (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	312.6242	232.5432	178.4364	79.2019	24.3773	0.0000	0.0000	0.0000	0.0000	89.6089	205.5743	320.5363 (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)	338.7045	251.9428	193.3222	85.8092	26.4110	0.0000	0.0000	0.0000	0.0000	97.0844	222.7241	347.2766 (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	208.5455	184.4704	196.2761	173.5115	168.7834	152.7439	151.3211	157.0270	158.3933	175.8133	185.9174	206.4123 (64)
Efficiency of water heater (217)m	84.9655	84.5803	83.8467	82.4179	80.8339	79.8000	79.8000	79.8000	79.8000	82.6273	84.2857	79.8000 (216)
Fuel for water heating, kWh/month	245.4471	218.1010	234.0893	210.5264	208.8027	191.4084	189.6254	196.7757	198.4878	212.7787	220.5800	242.7153 (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	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	18.6940	14.9970	13.5031	9.8930	7.6416	6.2433	6.9709	9.0611	11.7695	15.4422	17.4419	19.2135 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-29.2788	-41.4230	-59.7667	-67.4876	-73.0497	-68.3174	-67.4985	-63.5948	-56.7330	-47.5172	-32.2494	-25.2983 (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	-16.1113	-33.9394	-67.5314	-101.5253	-134.3200	-134.9599	-133.3470	-112.8504	-82.6612	-48.5418	-21.5156	-12.7350 (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												1563.2748 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2569.3379 (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)												150.8710 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1532.2527 (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

2837.2311 (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	1563.2748	0.2100	328.2877 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2569.3379	0.2100	539.5610 (264)
Space and water heating			867.8487 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	150.8710	0.1443	21.7753 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-632.2144	0.1345	-85.0278
PV Unit electricity exported	-900.0382	0.1259	-113.2901
Total			-198.3179 (269)
Total CO2, kg/year			703.2353 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.3400 (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	1563.2748	1.1300	1766.5006 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2569.3379	1.1300	2903.3519 (278)
Space and water heating			4669.8524 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	150.8710	1.5338	231.4109 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-632.2144	1.4971	-946.4594
PV Unit electricity exported	-900.0382	0.4620	-415.8522
Total			-1362.3116 (283)
Total Primary energy kWh/year			3669.0526 (286)
Target Primary Energy Rate (TPER)			59.1800 (287)

Energy Report



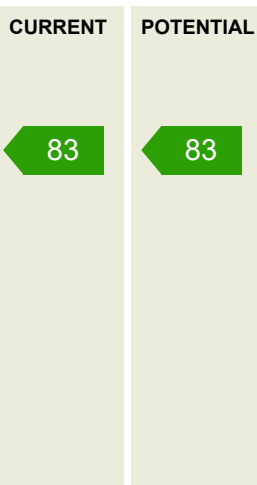
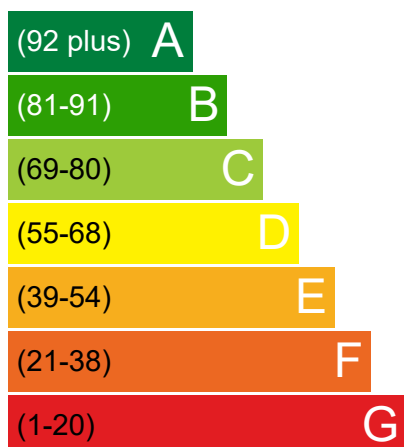
Dwelling Address	
Reference	Block D Flat 2-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	62

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

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

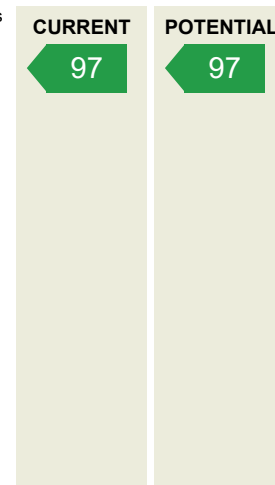
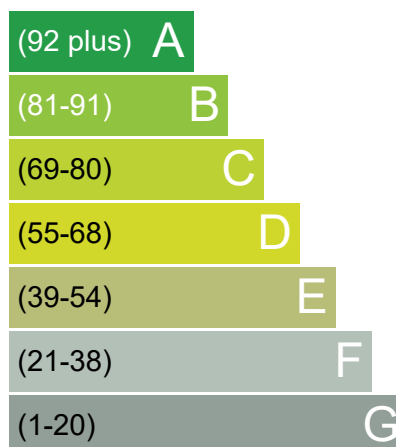
Energy Efficiency Rating

Most energy efficient - lower running costs

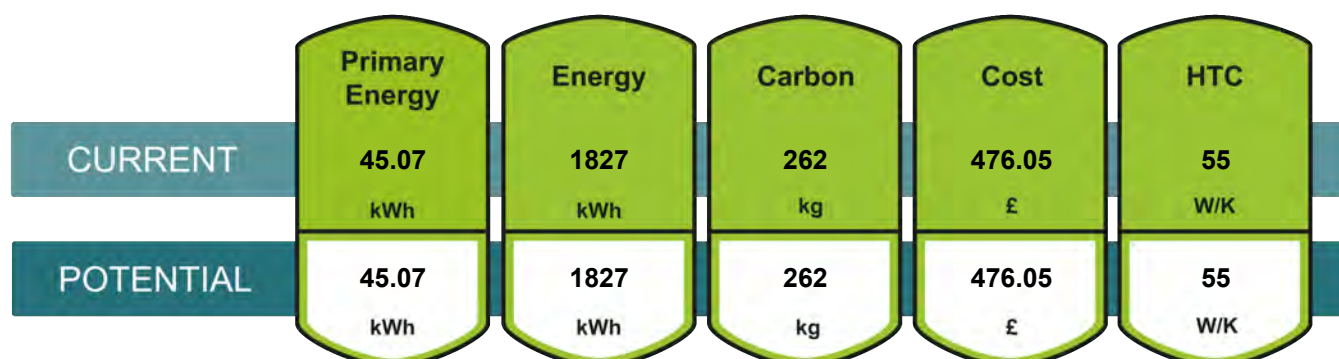


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£44	£44	
Heating		£81	£81	
Hot Water		£352	£352	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£476	£476	

Estimated energy use and potential savings



Space Heating

310

kWh per year



Water Heating

817

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

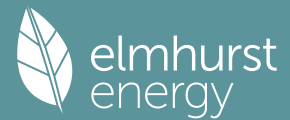
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block D Flat 3				Issued on Date	15/04/2025	
Assessment Reference	Be Green			Prop Type Ref			
Property							
SAP Rating	83 B	DER	4.51	TER	11.34		
Environmental	97 A	% DER < TER				60.23	
CO ₂ Emissions (t/year)	0.26	DFEE	28.31	TFEE	31.15		
Compliance Check	See BREL	% DFEE < TFEE				9.12	
% DPER < TPER	18.87	DPER	48.01	TPER	59.18		
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001	
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	62.0000 (1b)	2.6000 (2b)	161.2000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	161.2000 (5)

2. Ventilation rate

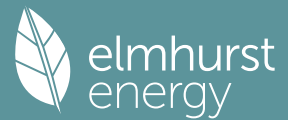
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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												
Opening Type 1			13.1000	1.3258	17.3674			(27)				
Heatloss Floor 1			62.0000	0.1300	8.0600	110.0000	6820.0000	(28a)				
External Wall 1	26.0000	13.1000	12.9000	0.1800	2.3220	190.0000	2450.9998	(29a)				
Total net area of external elements Aum(A, m2)			88.0000					(31)				
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.7494			(33)				
Main dwelling												
Party Ceiling 1			62.0000			20.0000	1240.0000	(32b)				
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		10510.9998	(34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							169.5323	(35)				
List of Thermal Bridges												
K1 Element				Length	Psi-value	Total						
E5 Ground floor (normal)				28.0000	0.0000	0.0000						
E16 Corner (normal)				10.4000	0.0000	0.0000						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000	(36)				
Point Thermal bridges						(36a) =	0.0000					
Total fabric heat loss						(33) + (36) + (36a) =	27.7494	(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

Full SAP Calculation Printout



(38)m	27.8476	27.7991	27.7515	27.5281	27.4863	27.2917	27.2917	27.2557	27.3667	27.4863	27.5709	27.6593 (38)
Heat transfer coeff	55.5970	55.5485	55.5009	55.2775	55.2357	55.0412	55.0412	55.0051	55.1161	55.2357	55.3203	55.4087 (39)
Average = Sum(39)m / 12 =												55.2773
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.8967	0.8959	0.8952	0.8916	0.8909	0.8878	0.8878	0.8872	0.8890	0.8909	0.8923	0.8937 (40)
HLP (average)												0.8916
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0376 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	24.6674	24.2951	23.7653	22.9720	22.2571	21.2729	20.5262	21.4392	21.9184	22.8936	23.9075	24.6479 (42b)
Hot water usage for other uses	35.4969	34.2061	32.9153	31.6245	30.3337	29.0429	29.0429	30.3337	31.6245	32.9153	34.2061	35.4969 (42c)
Average daily hot water use (litres/day)												55.1424 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	60.1643	58.5011	56.6806	54.5965	52.5907	50.3157	49.5691	51.7729	53.5429	55.8089	58.1136	60.1447 (44)
Energy conte	88.5722	77.4088	80.9954	71.3167	67.7685	58.1885	54.7753	60.9377	62.1071	71.9154	78.5425	88.3270 (45)
Energy content (annual)										Total = Sum(45)m =		860.8551
Distribution loss (46)m = 0.15 x (45)m	13.2858	11.6113	12.1493	10.6975	10.1653	8.7283	8.2163	9.1407	9.3161	10.7873	11.7814	13.2490 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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	142.9710	126.5432	135.3942	123.9607	122.1673	110.8325	109.1741	115.3365	114.7511	126.3142	131.1865	142.7258 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	142.9710	126.5432	135.3942	123.9607	122.1673	110.8325	109.1741	115.3365	114.7511	126.3142	131.1865	142.7258 (64)
								Total per year (kWh/year) = Sum(64)m =				1501.3571 (64)
12Total per year (kWh/year)												1501 (64)
Electric shower(s)	46.7551	41.6592	45.4903	43.4108	44.2254	42.1867	43.5930	44.2254	43.4108	45.4903	44.6349	46.7551 (64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				531.8370 (64a)
Heat gains from water heating, kWh/month	84.6581	75.4608	81.8226	76.6807	77.1084	72.0096	72.6301	74.8372	73.6185	78.8035	79.3893	84.5765 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790	101.8790 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	89.9699	99.6095	89.9699	92.9689	89.9699	92.9689	89.9699	89.9699	92.9689	89.9699	92.9689	89.9699 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	177.9613	179.8080	175.1544	165.2475	152.7418	140.9882	133.1361	131.2894	135.9430	145.8499	158.3556	170.1092 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879	33.1879 (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)	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032	-81.5032 (71)
Water heating gains (Table 5)	113.7878	112.2928	109.9766	106.5010	103.6403	100.0133	97.6210	100.5876	102.2479	105.9187	110.2629	113.6781 (72)
Total internal gains	435.2827	445.2740	428.6646	418.2811	399.9157	387.5341	374.2907	375.4106	384.7235	395.3021	415.1511	427.3209 (73)

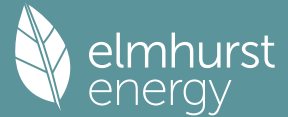
6. Solar gains

[Jan]												Gains
				Area	Solar flux		g		FF	Access		
				m2	Table 6a		Specific data		Specific data	factor		
					W/m2		or Table 6b		or Table 6c	Table 6d		W
Northeast				6.2000		11.2829		0.3500		0.0000	0.7700	18.8527 (75)
Southeast				2.1000		36.7938		0.3500		0.0000	0.7700	20.8235 (77)
Northwest				4.8000		11.2829		0.3500		0.0000	0.7700	14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	489.5544	548.8290	599.8637	679.8693	738.0651	743.0975	708.8272	649.7929	586.7452	517.7093	482.1794	472.4570 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	52.5158	52.5617	52.6067	52.8193	52.8593	53.0462	53.0462	53.0809	52.9740	52.8593	52.7785	52.6943
alpha	4.5011	4.5041	4.5071	4.5213	4.5240	4.5364	4.5364	4.5387	4.5316	4.5240	4.5186	4.5130
util living area	0.9727	0.9540	0.9155	0.8121	0.6485	0.4655	0.3399	0.3861	0.6130	0.8588	0.9510	0.9764 (86)

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Living	19.8819	20.0834	20.3680	20.7111	20.9132	20.9842	20.9970	20.9947	20.9489	20.6785	20.2318	19.8383
Non living	18.8736	19.1257	19.4769	19.8828	20.0998	20.1674	20.1766	20.1759	20.1392	19.8562	19.3170	18.8206
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	20.4280	20.0834	20.3680	20.7111	20.9132	20.9842	20.9970	20.9947	20.9489	20.6785	20.2318	20.0008 (87)
Th 2	20.1703	20.1709	20.1716	20.1747	20.1752	20.1779	20.1779	20.1784	20.1769	20.1752	20.1741	20.1729 (88)
util rest of house												
MIT 2	0.9673	0.9454	0.9000	0.7816	0.6021	0.4087	0.2772	0.3186	0.5506	0.8276	0.9403	0.9717 (89)
Living area fraction	19.6533	19.1257	19.4769	19.8828	20.0998	20.1674	20.1766	20.1759	20.1392	19.8562	19.3170	19.0643 (90)
MIT	20.0157	19.5737	19.8937	20.2703	20.4803	20.5495	20.5603	20.5589	20.5179	20.2408	19.7449	19.5023 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0157	19.5737	19.8937	20.2703	20.4803	20.5495	20.5603	20.5589	20.5179	20.2408	19.7449	19.5023 (93)

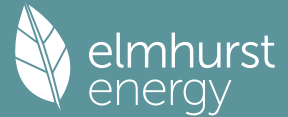
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9662	0.9380	0.8941	0.7853	0.6197	0.4346	0.3065	0.3500	0.5771	0.8303	0.9337	0.9671 (94)
Useful gains	473.0009	514.7784	536.3176	533.9197	457.3908	322.9677	217.2612	227.4569	338.6325	429.8667	450.1885	456.8967 (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	873.7456	815.0995	743.3611	628.5194	484.9851	327.4665	217.9794	228.7583	353.7309	532.5184	699.5185	847.8815 (97)
Space heating kWh	298.1540	201.8158	154.0404	68.1118	20.5302	0.0000	0.0000	0.0000	0.0000	76.3728	179.5176	290.8927 (98a)
Space heating requirement - total per year (kWh/year)												1289.4353
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	298.1540	201.8158	154.0404	68.1118	20.5302	0.0000	0.0000	0.0000	0.0000	76.3728	179.5176	290.8927 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1289.4353
Space heating per m2										(98c) / (4) =		20.7973 (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 %)												302.2825 (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	298.1540	201.8158	154.0404	68.1118	20.5302	0.0000	0.0000	0.0000	0.0000	76.3728	179.5176	290.8927 (98)
Space heating efficiency (main heating system 1)	302.2825	302.2825	302.2825	302.2825	302.2825	0.0000	0.0000	0.0000	0.0000	302.2825	302.2825	302.2825 (210)
Space heating fuel (main heating system)	98.6342	66.7640	50.9591	22.5325	6.7917	0.0000	0.0000	0.0000	0.0000	25.2654	59.3873	96.2321 (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	142.9710	126.5432	135.3942	123.9607	122.1673	110.8325	109.1741	115.3365	114.7511	126.3142	131.1865	142.7258 (64)
Efficiency of water heater (217)m	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795	183.7795 (216)
Fuel for water heating, kWh/month	77.7949	68.8560	73.6721	67.4508	66.4750	60.3073	59.4049	62.7581	62.4396	68.7314	71.3826	77.6614 (219)
Space cooling fuel requirement												
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (231)
Lighting	20.7574	16.6524	14.9936	10.9850	8.4851	6.9324	7.7404	10.0613	13.0686	17.1467	19.3672	21.3343 (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												426.5663 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												183.7795
Water heating fuel used												816.9341 (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)												167.5244 (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												1942.8618 (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	426.5663	0.1565	66.7644 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	816.9341	0.1403	114.6519 (264)
Energy for instantaneous electric shower(s)	531.8370	0.1391	73.9903 (264a)
Space and water heating			181.4164 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	167.5244	0.1443	24.1789 (268)
Total CO2, kg/year			279.5856 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.5100 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	426.5663	1.5794	673.7257 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	816.9341	1.5189	1240.8519 (278)
Energy for instantaneous electric shower(s)	531.8370	1.5143	805.3790 (278a)
Space and water heating			1914.5776 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	167.5244	1.5338	256.9545 (282)
Total Primary energy kWh/year			2976.9111 (286)
Dwelling Primary energy Rate (DPER)			48.0100 (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	62.0000 (1b)	x 2.6000 (2b)	= 161.2000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	62.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	161.2000 (5)

2. Ventilation rate

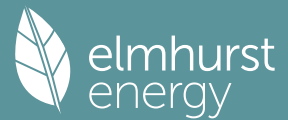
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1241 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3741 (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) = 0.3180 (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	0.4054	0.3974	0.3895	0.3498	0.3418	0.3021	0.3021	0.2941	0.3180	0.3418	0.3577	0.3736 (22b)
Effective ac	0.5822	0.5790	0.5759	0.5612	0.5584	0.5456	0.5456	0.5433	0.5505	0.5584	0.5640	0.5698 (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 Opening Type			13.1000	1.1450	15.0000		(27)
Heatloss Floor 1			62.0000	0.1300	8.0600		(28a)
External Wall 1	26.0000	13.1000	12.9000	0.1800	2.3220		(29a)
Total net area of external elements Aum (A, m2)			88.0000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.3820		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							179.5323 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal) 10.4000 0.0900 0.9360
Thermal bridges (Sum(L x Psi) calculated using Appendix K) 5.4160 (36)
Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 30.7980 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 30.9693 30.7996 30.6332 29.8517 29.7055 29.0248 29.0248 28.8988 29.2870 29.7055 30.0013 30.3105 (38)
Average = Sum(39)m / 12 = 61.7673 61.5976 61.4312 60.6497 60.5035 59.8228 59.8228 59.6968 60.0850 60.5035 60.7993 61.1085 (39)
60.6490
HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 0.9962 0.9935 0.9908 0.9782 0.9759 0.9649 0.9649 0.9629 0.9691 0.9759 0.9806 0.9856 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.0376 (42)
Hot water usage for mixer showers 58.3831 57.5057 56.2272 53.7810 51.9757 49.9625 48.8182 50.0871 51.4780 53.6395 56.1383 58.1594 (42a)
Hot water usage for baths 25.2299 24.8552 24.3275 23.3546 22.6261 21.8183 21.3820 21.9060 22.4765 23.3408 24.3338 25.1446 (42b)
Hot water usage for other uses 35.4969 34.2061 32.9153 31.6245 30.3337 29.0429 29.0429 30.3337 31.6245 32.9153 34.2061 35.4969 (42c)
Average daily hot water use (litres/day) 109.4892 (43)
Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 119.1099 116.5670 113.4700 108.7601 104.9355 100.8238 99.2431 102.3267 105.5789 109.8956 114.6781 118.8009 (44)
Energy content (annual) 188.6409 165.9898 174.3992 148.8871 141.2634 123.9746 120.0260 126.7019 130.1894 149.1274 163.3800 186.0135 (45)
Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 1818.5931
28.2961 24.8985 26.1599 22.3331 21.1895 18.5962 18.0039 19.0053 19.5284 22.3691 24.5070 27.9020 (46)
Water storage loss:
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day): 1.3938 (48)
Temperature factor from Table 2b 0.5400 (49)
Enter (49) or (54) in (55) 0.7527 (55)
Total storage loss 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (56)
If cylinder contains dedicated solar storage 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (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 235.2358 208.0755 220.9941 193.9790 187.8583 169.0664 166.6209 173.2968 175.2812 195.7223 208.4719 232.6084 (62)
WWHRS -26.6903 -23.6051 -24.7179 -20.4674 -19.0749 -16.3225 -15.2998 -16.2698 -16.8879 -19.9090 -22.5545 -26.1961 (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 208.5455 184.4704 196.2761 173.5115 168.7834 152.7439 151.3211 157.0270 158.3933 175.8133 185.9174 206.4123 (64)
12Total per year (kWh/year) Total per year (kWh/year) = Sum(64)m = 2119.2152 (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 99.9990 88.8602 95.2636 85.5784 84.2460 77.2950 77.1846 79.4043 79.3614 86.8608 90.3973 99.1254 (65)

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

Metabolic gains (Table 5), Watts (66)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 89.9699 99.6095 89.9699 92.9689 89.9699 92.9689 89.9699 89.9699 92.9689 89.9699 92.9689 89.9699 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 177.9613 179.8080 175.1544 165.2475 152.7418 140.9882 133.1361 131.2894 135.9430 145.8499 158.3556 170.1092 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 33.1879 33.1879 33.1879 33.1879 33.1879 33.1879 33.1879 33.1879 33.1879 33.1879 33.1879 33.1879 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -81.5032 -81.5032 -81.5032 -81.5032 -81.5032 -81.5032 -81.5032 -81.5032 -81.5032 -81.5032 -81.5032 -81.5032 (71)
Water heating gains (Table 5) 134.4073 132.2324 128.0425 118.8589 113.2339 107.3542 103.7427 106.7262 110.2242 116.7483 125.5519 133.2331 (72)
Total internal gains 458.9022 468.2136 449.7305 433.6390 412.5093 394.8750 380.4124 381.5492 392.6998 409.1318 433.4400 449.8758 (73)

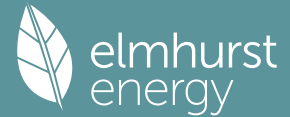
6. Solar gains

[Jan] Area m2 Solar flux Table 6a W/m2 g Specific data or Table 6b FF Specific data or Table 6c Access factor Table 6d Gains W
Northeast 6.2000 11.2829 0.6300 0.7000 21.3789 (75)
Southeast 2.1000 36.7938 0.6300 0.7000 23.6138 (77)
Northwest 4.8000 11.2829 0.6300 0.7000 16.5514 (81)
Solar gains 61.5442 117.4314 194.1398 296.6411 383.4613 403.2089 379.3644 311.1496 229.0926 138.8097 76.0101 51.1843 (83)
Total gains 520.4464 585.6450 643.8703 730.2801 795.9706 798.0839 759.7767 692.6988 621.7924 547.9416 509.4501 501.0602 (84)

7. Mean internal temperature (heating season)

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

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	50.0579	50.1959	50.3318	50.9804	51.1036	51.6850	51.6850	51.7942	51.4595	51.1036	50.8550	50.5976
alpha	4.3372	4.3464	4.3555	4.3987	4.4069	4.4457	4.4457	4.4529	4.4306	4.4069	4.3903	4.3732
util living area	0.9738	0.9559	0.9182	0.8168	0.6538	0.4700	0.3444	0.3925	0.6253	0.8667	0.9539	0.9773 (86)
MIT	19.7891	20.0025	20.3078	20.6815	20.9020	20.9820	20.9964	20.9937	20.9401	20.6420	20.1680	19.7576 (87)
Th 2	20.0865	20.0887	20.0910	20.1015	20.1035	20.1127	20.1127	20.1144	20.1092	20.1035	20.0995	20.0953 (88)
util rest of house	0.9683	0.9468	0.9018	0.7842	0.6036	0.4084	0.2759	0.3187	0.5576	0.8341	0.9430	0.9724 (89)
MIT 2	18.6912	18.9594	19.3370	19.7842	20.0203	20.1013	20.1112	20.1116	20.0663	19.7525	19.1781	18.6580 (90)
Living area fraction									FLA = Living area /	(4) =		0.4677 (91)
MIT	19.2047	19.4473	19.7910	20.2039	20.4327	20.5132	20.5252	20.5242	20.4750	20.1686	19.6411	19.1723 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2047	19.4473	19.7910	20.2039	20.4327	20.5132	20.5252	20.5242	20.4750	20.1686	19.6411	19.1723 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9615	0.9392	0.8956	0.7882	0.6226	0.4365	0.3079	0.3531	0.5862	0.8367	0.9362	0.9662 (94)
Useful gains	500.4296	550.0336	576.6503	575.5747	495.5947	348.3912	233.9405	244.6096	364.5158	458.4886	476.9703	484.1085 (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	920.6234	896.0801	816.4842	685.5773	528.3599	353.7447	234.8191	246.2004	383.0428	578.9307	762.4902	914.9369 (97)
Space heating kWh	312.6242	232.5432	178.4364	79.2019	24.3773	0.0000	0.0000	0.0000	0.0000	89.6089	205.5743	320.5363 (98a)
Space heating requirement - total per year (kWh/year)												1442.9027
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	312.6242	232.5432	178.4364	79.2019	24.3773	0.0000	0.0000	0.0000	0.0000	89.6089	205.5743	320.5363 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1442.9027
Space heating per m2										(98c) / (4) =		23.2726 (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	312.6242	232.5432	178.4364	79.2019	24.3773	0.0000	0.0000	0.0000	0.0000	89.6089	205.5743	320.5363 (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)	338.7045	251.9428	193.3222	85.8092	26.4110	0.0000	0.0000	0.0000	0.0000	97.0844	222.7241	347.2766 (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	208.5455	184.4704	196.2761	173.5115	168.7834	152.7439	151.3211	157.0270	158.3933	175.8133	185.9174	206.4123 (64)
Efficiency of water heater (217)m	84.9655	84.5803	83.8467	82.4179	80.8339	79.8000	79.8000	79.8000	79.8000	82.6273	84.2857	79.8000 (216)
Fuel for water heating, kWh/month	245.4471	218.1010	234.0893	210.5264	208.8027	191.4084	189.6254	196.7757	198.4878	212.7787	220.5800	242.7153 (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	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	18.6940	14.9970	13.5031	9.8930	7.6416	6.2433	6.9709	9.0611	11.7695	15.4422	17.4419	19.2135 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-29.2788	-41.4230	-59.7667	-67.4876	-73.0497	-68.3174	-67.4985	-63.5948	-56.7330	-47.5172	-32.2494	-25.2983 (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	-16.1113	-33.9394	-67.5314	-101.5253	-134.3200	-134.9599	-133.3470	-112.8504	-82.6612	-48.5418	-21.5156	-12.7350 (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												1563.2748 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2569.3379 (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)												150.8710 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1532.2527 (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)

Full SAP Calculation Printout



Total delivered energy for all uses

2837.2311 (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	1563.2748	0.2100	328.2877 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2569.3379	0.2100	539.5610 (264)
Space and water heating			867.8487 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	150.8710	0.1443	21.7753 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-632.2144	0.1345	-85.0278
PV Unit electricity exported	-900.0382	0.1259	-113.2901
Total			-198.3179 (269)
Total CO2, kg/year			703.2353 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.3400 (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	1563.2748	1.1300	1766.5006 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2569.3379	1.1300	2903.3519 (278)
Space and water heating			4669.8524 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	150.8710	1.5338	231.4109 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-632.2144	1.4971	-946.4594
PV Unit electricity exported	-900.0382	0.4620	-415.8522
Total			-1362.3116 (283)
Total Primary energy kWh/year			3669.0526 (286)
Target Primary Energy Rate (TPER)			59.1800 (287)

Energy Report



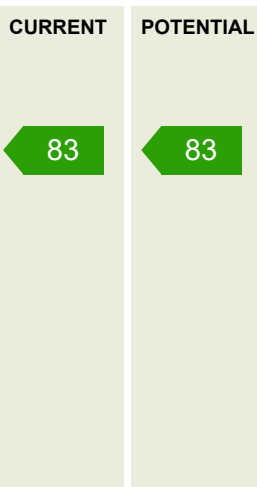
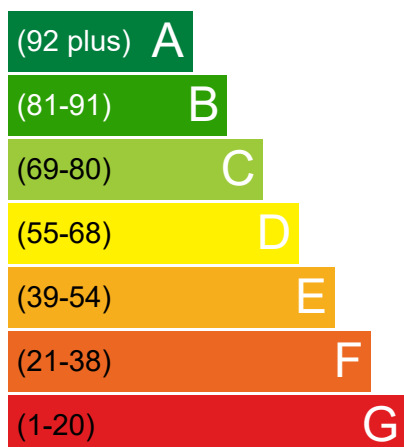
Dwelling Address	
Reference	Block D Flat 3-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	62

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

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

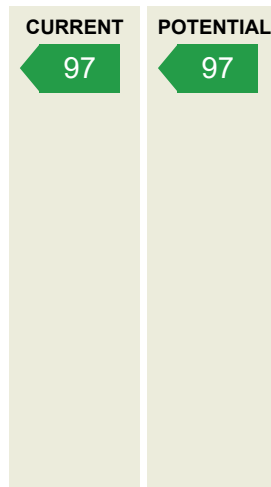
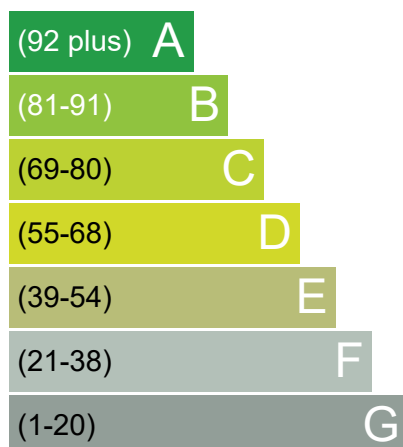
Energy Efficiency Rating

Most energy efficient - lower running costs

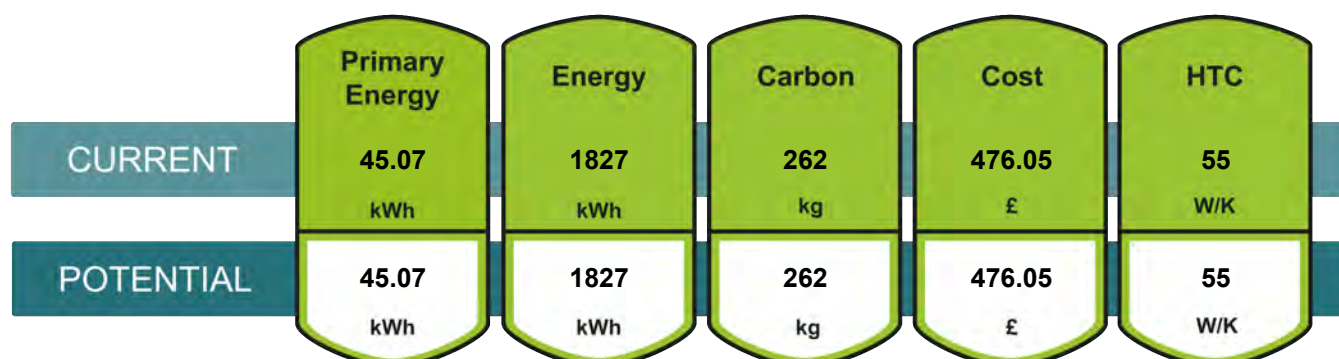


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£44	£44	
Heating		£81	£81	
Hot Water		£352	£352	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£476	£476	

Estimated energy use and potential savings



Space Heating

310

kWh per year



Water Heating

817

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

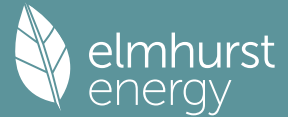
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Full SAP Calculation Printout



Property Reference	Block D Flat 4				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	83 B	DER	4.01	TER	9.98	
Environmental	96 A	% DER < TER				59.82
CO ₂ Emissions (t/year)	0.34	DFEE	31.35	TFEE	33.41	
Compliance Check	See BREL	% DFEE < TFEE				6.17
% DPER < TPER	18.46	DPER	42.39	TPER	51.98	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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	93.0000 (1b)	2.6000 (2b)	241.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		241.8000 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	241.8000 (5)

2. Ventilation rate

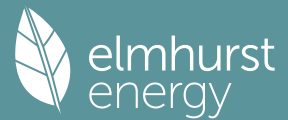
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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											
Opening Type 1			13.1000	1.3258	17.3674			(27)			
Heatloss Floor 1			93.0000	0.1300	12.0900	110.0000	10230.0000	(28a)			
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860	190.0000	13812.9994	(29a)			
Total net area of external elements Aum(A, m2)			178.8000					(31)			
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	42.5434			(33)			
Main dwelling											
Party Ceiling 1			93.0000			20.0000	1860.0000	(32b)			
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		25902.9994	(34)			
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							278.5269	(35)			
List of Thermal Bridges											
K1 Element				Length	Psi-value	Total					
E5 Ground floor (normal)				28.0000	0.0000	0.0000					
E16 Corner (normal)				10.4000	0.0000	0.0000					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000	(36)			
Point Thermal bridges						(36a) =	0.0000				
Total fabric heat loss					(33) + (36) + (36a) =		42.5434	(37)			
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	41.7714	41.6986	41.6273	41.2922	41.2295	40.9376	40.9376	40.8836	41.0500	41.2295	41.3563	41.4889 (38)
Heat transfer coeff	84.3148	84.2420	84.1707	83.8356	83.7729	83.4810	83.4810	83.4270	83.5934	83.7729	83.8997	84.0323 (39)
Average = Sum(39)m / 12 =												83.8353
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9066	0.9058	0.9051	0.9015	0.9008	0.8976	0.8976	0.8971	0.8989	0.9008	0.9021	0.9036 (40)
HLP (average)												0.9015
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6646 (42)
Hot water usage for mixer showers												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths												
	29.0877	28.6486	28.0239	27.0884	26.2454	25.0848	24.2043	25.2810	25.8461	26.9960	28.1916	29.0646 (42b)
Hot water usage for other uses												
	41.9181	40.3938	38.8695	37.3453	35.8210	34.2967	34.2967	35.8210	37.3453	38.8695	40.3938	41.9181 (42c)
Average daily hot water use (litres/day)												65.0786 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	71.0058	69.0424	66.8935	64.4337	62.0663	59.3815	58.5010	61.1019	63.1913	65.8656	68.5854	70.9827 (44)
Energy conte	104.5328	91.3571	95.5894	84.1665	79.9787	68.6727	64.6453	71.9181	73.2988	84.8744	92.6955	104.2433 (45)
Energy content (annual)												Total = Sum(45)m = 1015.9726
Distribution loss (46)m = 0.15 x (45)m												
	15.6799	13.7036	14.3384	12.6250	11.9968	10.3009	9.6968	10.7877	10.9948	12.7312	13.9043	15.6365 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss												
	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage												
	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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												
	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h												
	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (64)
Total per year (kWh/year)												1656.4746 (64)
Electric shower(s)												1656 (64)
	55.1745	49.1609	53.6818	51.2279	52.1892	49.7834	51.4428	52.1892	51.2279	53.6818	52.6724	55.1745 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												627.6062 (64a)
Heat gains from water heating, kWh/month												
	92.0698	81.9740	88.7230	82.9075	83.1593	77.3947	77.8743	80.4791	79.2940	85.1602	86.1046	91.9736 (65)

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

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	132.1206	146.2764	132.1206	136.5246	132.1206	136.5246	132.1206	132.1206	136.5246	132.1206	136.5246	132.1206 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	244.4900	247.0270	240.6338	227.0233	209.8424	193.6949	182.9074	180.3703	186.7636	200.3741	217.5549	233.7024 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230 (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)												
	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839 (71)
Water heating gains (Table 5)												
	123.7497	121.9851	119.2513	115.1494	111.7732	107.4927	104.6698	108.1708	110.1306	114.4627	119.5897	123.6204 (72)
Total internal gains												
	563.3293	578.2574	554.9746	541.6662	516.7052	500.6811	482.6667	483.6307	496.3877	509.9263	536.6381	552.4124 (73)

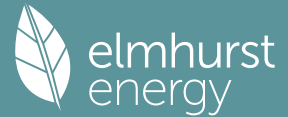
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W			
Northeast				6.2000	11.2829	0.3500	0.0000	0.7700	18.8527 (75)			
Southeast				2.1000	36.7938	0.3500	0.0000	0.7700	20.8235 (77)			
Northwest				4.8000	11.2829	0.3500	0.0000	0.7700	14.5956 (81)			
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	617.6010	681.8124	726.1737	803.2544	854.8545	856.2445	817.2032	758.0131	698.4094	632.3335	603.6664	597.5485 (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	85.3382	85.4120	85.4844	85.8261	85.8903	86.1906	86.1906	86.2464	86.0747	85.8903	85.7605	85.6251
alpha	6.6892	6.6941	6.6990	6.7217	6.7260	6.7460	6.7460	6.7498	6.7383	6.7260	6.7174	6.7083
util living area												
	0.9977	0.9950	0.9873	0.9481	0.8268	0.6140	0.4484	0.5037	0.7746	0.9653	0.9942	0.9982 (86)

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Living	20.1273	20.2528	20.4449	20.7211	20.9203	20.9905	20.9990	20.9979	20.9605	20.7122	20.3757	20.1010
Non living	19.1413	19.3018	19.5457	19.8861	20.1030	20.1646	20.1692	20.1693	20.1436	19.8818	19.4615	19.1097
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	20.5536	20.2528	20.4449	20.7211	20.9203	20.9905	20.9990	20.9979	20.9605	20.7122	20.3757	20.2268 (87)
Th 2	20.1619	20.1625	20.1632	20.1663	20.1668	20.1695	20.1695	20.1700	20.1685	20.1668	20.1657	20.1645 (88)
util rest of house												
	0.9969	0.9932	0.9826	0.9295	0.7770	0.5389	0.3644	0.4143	0.7012	0.9490	0.9917	0.9976 (89)
MIT 2	19.7550	19.3018	19.5457	19.8861	20.1030	20.1646	20.1692	20.1693	20.1436	19.8818	19.4615	19.2998 (90)
Living area fraction												
MIT	19.8924	19.4654	19.7004	20.0298	20.2436	20.3067	20.3120	20.3119	20.2841	20.0246	19.6188	19.4593 (92)
Temperature adjustment												0.0000
adjusted MIT	19.8924	19.4654	19.7004	20.0298	20.2436	20.3067	20.3120	20.3119	20.2841	20.0246	19.6188	19.4593 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9966	0.9912	0.9792	0.9259	0.7820	0.5516	0.3789	0.4297	0.7121	0.9455	0.9896	0.9968 (94)
Useful gains	615.5036	675.8163	711.0359	743.6978	668.4801	472.3070	309.6009	325.7242	497.3530	597.8494	597.3592	595.6404 (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	1314.6693	1227.0207	1111.0856	933.0710	715.7249	476.3987	309.8784	326.3544	516.9519	789.5290	1050.3243	1282.2703 (97)
Space heating kWh	520.1792	370.4094	297.6370	136.3487	35.1501	0.0000	0.0000	0.0000	0.0000	142.6096	326.1348	510.8526 (98a)
Space heating requirement - total per year (kWh/year)												2339.3215
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	520.1792	370.4094	297.6370	136.3487	35.1501	0.0000	0.0000	0.0000	0.0000	142.6096	326.1348	510.8526 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2339.3215
Space heating per m2										(98c) / (4) =		25.1540 (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 %)												302.9509 (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	520.1792	370.4094	297.6370	136.3487	35.1501	0.0000	0.0000	0.0000	0.0000	142.6096	326.1348	510.8526 (98)
Space heating efficiency (main heating system 1)	302.9509	302.9509	302.9509	302.9509	302.9509	0.0000	0.0000	0.0000	0.0000	302.9509	302.9509	302.9509 (210)
Space heating fuel (main heating system)	171.7041	122.2671	98.2459	45.0069	11.6026	0.0000	0.0000	0.0000	0.0000	47.0735	107.6527	168.6255 (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	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (64)
Efficiency of water heater (217)m	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000 (216)
Fuel for water heating, kWh/month	86.2821	76.2712	81.4268	74.2728	72.9520	65.8614	64.6276	68.5760	68.3728	75.6098	78.9031	86.1249 (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	32.8170	26.3270	23.7045	17.3670	13.4147	10.9600	12.2374	15.9066	20.6611	27.1085	30.6190	33.7291 (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												772.1783 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												184.2000
Water heating fuel used												899.2805 (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)												264.8519 (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												2563.9168 (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	772.1783	0.1563	120.6932 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	899.2805	0.1405	126.3110 (264)
Energy for instantaneous electric shower(s)	627.6062	0.1391	87.3139 (264a)
Space and water heating			247.0042 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	264.8519	0.1443	38.2263 (268)
Total CO ₂ , kg/year			372.5444 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.0100 (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	772.1783	1.5787	1219.0015 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	899.2805	1.5193	1366.3119 (278)
Energy for instantaneous electric shower(s)	627.6062	1.5143	950.4055 (278a)
Space and water heating			2585.3134 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	264.8519	1.5338	406.2386 (282)
Total Primary energy kWh/year			3941.9575 (286)
Dwelling Primary energy Rate (DPER)			42.3900 (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	93.0000 (1b)	x 2.6000 (2b)	= 241.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	241.8000 (5)

2. Ventilation rate

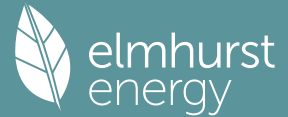
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (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) =	30.0000 / (5) = 0.1241 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3741 (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) = 0.3180 (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	0.4054	0.3974	0.3895	0.3498	0.3418	0.3021	0.3021	0.2941	0.3180	0.3418	0.3577	0.3736 (22b)
Effective ac	0.5822	0.5790	0.5759	0.5612	0.5584	0.5456	0.5456	0.5433	0.5505	0.5584	0.5640	0.5698 (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							
TER Opening Type			13.1000	1.1450	15.0000		(27)
Heatloss Floor 1			93.0000	0.1300	12.0900		(28a)
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860		(29a)
Total net area of external elements Aum(A, m ²)			178.8000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	40.1760		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							288.5269 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000 0.0900 0.9360 5.4160 (36)
(33) + (36) + (36a) = 0.0000
45.5920 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 46.4540 46.1994 45.9498 44.7775 44.5582 43.5372 43.5372 43.3482 43.9305 44.5582 45.0019 45.4658 (38)
92.0460 91.7914 91.5418 90.3695 90.1502 89.1292 89.1292 88.9402 89.5225 90.1502 90.5939 91.0578 (39)
Average = Sum(39)m / 12 = 90.3685

HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 0.9897 0.9870 0.9843 0.9717 0.9694 0.9584 0.9584 0.9563 0.9626 0.9694 0.9741 0.9791 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6646 (42)
Hot water usage for mixer showers 68.8963 67.8609 66.3522 63.4655 61.3351 58.9594 57.6091 59.1064 60.7477 63.2985 66.2473 68.6323 (42a)
Hot water usage for baths 29.7509 29.3090 28.6868 27.5396 26.6806 25.7280 25.2135 25.8314 26.5041 27.5233 28.6942 29.6503 (42b)
Hot water usage for other uses 41.9181 40.3938 38.8695 37.3453 35.8210 34.2967 34.2967 35.8210 37.3453 38.8695 40.3938 41.9181 (42c)
Average daily hot water use (litres/day) 129.2112 (43)

Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 140.5653 137.5638 133.9086 128.3503 123.8366 118.9841 117.1192 120.7587 124.5971 129.6914 135.3353 140.2008 (44)
Energy content (annual) 222.6211 195.8890 205.8125 175.7052 166.7079 146.3048 141.6456 149.5245 153.6407 175.9900 192.8100 219.5205 (45)
Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 2146.1718
33.3932 29.3834 30.8719 26.3558 25.0062 21.9457 21.2468 22.4287 23.0461 26.3985 28.9215 32.9281 (46)

Water storage loss:
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):
Temperature factor from Table 2b 1.3938 (48)
Enter (49) or (54) in (55) 0.5400 (49)
Total storage loss 0.7527 (55)
23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (56)

If cylinder contains dedicated solar storage 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (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
269.2160 237.9747 252.4074 220.7970 213.3028 191.3967 188.2405 196.1194 198.7325 222.5849 237.9018 266.1154 (62)
WWHRS -31.4965 -27.8558 -29.1690 -24.1531 -22.5098 -19.2618 -18.0548 -19.1995 -19.9290 -23.4941 -26.6159 -30.9132 (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 237.7195 210.1190 223.2384 196.6439 190.7931 172.1349 170.1856 176.9199 178.8035 199.0909 211.2859 235.2022 (64)
Total per year (kWh/year) = Sum(64)m = 2402.1368 (64)
2402 (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)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month
111.2974 98.8017 105.7086 94.4954 92.7063 84.7198 84.3731 86.9928 87.1590 95.7926 100.1828 110.2665 (65)

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

Metabolic gains (Table 5), Watts
(66)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 (66)
132.1206 146.2764 132.1206 136.5246 132.1206 136.5246 132.1206 132.1206 136.5246 132.1206 136.5246 132.1206 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 244.4900 247.0270 240.6338 227.0233 209.8424 193.6949 182.9074 180.3703 186.7636 200.3741 217.5549 233.7024 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 (71)
Water heating gains (Table 5) 149.5933 147.0263 142.0814 131.2437 124.6053 117.6664 113.4047 116.9258 121.0542 128.7535 139.1428 148.2077 (72)
Total internal gains 592.1729 606.2986 580.8047 560.7605 532.5373 510.8549 491.4016 492.3857 507.3113 527.2171 559.1912 579.9996 (73)

6. Solar gains

[Jan] Area Solar flux g FF Access Gains
m2 Table 6a W/m2 Specific data Specific data factor W
or Table 6b or Table 6c Table 6d

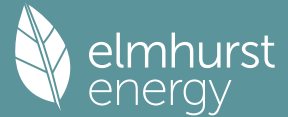
Northeast 6.2000 11.2829 0.6300 0.7000 0.7700 21.3789 (75)
Southeast 2.1000 36.7938 0.6300 0.7000 0.7700 23.6138 (77)
Northwest 4.8000 11.2829 0.6300 0.7000 0.7700 16.5514 (81)

Solar gains 61.5442 117.4314 194.1398 296.6411 383.4613 403.2089 379.3644 311.1496 229.0926 138.8097 76.0101 51.1843 (83)
Total gains 653.7170 723.7300 774.9445 857.4016 915.9986 914.0638 870.7660 803.5353 736.4039 666.0269 635.2013 631.1840 (84)

7. Mean internal temperature (heating season)

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

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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	80.9771	81.2017	81.4231	82.4792	82.6799	83.6270	83.6270	83.8048	83.2596	82.6799	82.2750	81.8559	
alpha	6.3985	6.4134	6.4282	6.4986	6.5120	6.5751	6.5751	6.5870	6.5506	6.5120	6.4850	6.4571	
util living area	0.9976	0.9947	0.9867	0.9470	0.8256	0.6132	0.4491	0.5062	0.7806	0.9662	0.9941	0.9981	(86)
MIT	20.0664	20.2001	20.4058	20.7021	20.9130	20.9895	20.9988	20.9975	20.9546	20.6887	20.3360	20.0491	(87)
Th 2	20.0919	20.0942	20.0964	20.1070	20.1089	20.1182	20.1182	20.1199	20.1146	20.1089	20.1049	20.1008	(88)
util rest of house	0.9967	0.9928	0.9815	0.9271	0.7727	0.5338	0.3598	0.4110	0.7033	0.9493	0.9915	0.9973	(89)
MIT 2	19.0062	19.1784	19.4406	19.8112	20.0407	20.1129	20.1178	20.1191	20.0867	19.8033	19.3607	18.9910	(90)
Living area fraction									FLA = Living area /	(4) =		0.1720	(91)
MIT	19.1886	19.3542	19.6067	19.9645	20.1908	20.2637	20.2694	20.2702	20.2360	19.9557	19.5285	19.1730	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.1886	19.3542	19.6067	19.9645	20.1908	20.2637	20.2694	20.2702	20.2360	19.9557	19.5285	19.1730	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9954	0.9906	0.9778	0.9233	0.7780	0.5472	0.3752	0.4275	0.7147	0.9456	0.9892	0.9963	(94)
Useful gains	650.7054	716.9087	757.7536	791.6519	712.6743	500.1904	326.7237	343.4778	526.3391	629.7749	628.3455	628.8296	(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	1370.4349	1326.7699	1199.8076	999.8896	765.4462	504.7989	327.0503	344.2183	549.3092	843.4147	1125.9477	1363.4103	(97)
Space heating kWh	535.4787	409.8268	328.8881	149.9311	39.2623	0.0000	0.0000	0.0000	0.0000	158.9480	358.2736	546.5280	(98a)
Space heating requirement - total per year (kWh/year)												2527.1367	
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	535.4787	409.8268	328.8881	149.9311	39.2623	0.0000	0.0000	0.0000	0.0000	158.9480	358.2736	546.5280	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2527.1367	
Space heating per m2										(98c) / (4) =		27.1735	(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	535.4787	409.8268	328.8881	149.9311	39.2623	0.0000	0.0000	0.0000	0.0000	158.9480	358.2736	546.5280	(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)	580.1503	444.0160	356.3252	162.4389	42.5377	0.0000	0.0000	0.0000	0.0000	172.2080	388.1621	592.1214	(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	237.7195	210.1190	223.2384	196.6439	190.7931	172.1349	170.1856	176.9199	178.8035	199.0909	211.2859	235.2022	(64)	
Efficiency of water heater (217)m	85.8241	85.5306	84.9273	83.4593	81.2046	79.8000	79.8000	79.8000	79.8000	83.5597	85.2340	79.8000	(216)	
Fuel for water heating, kWh/month	276.9847	245.6654	262.8583	235.6166	234.9535	215.7079	213.2652	221.7041	224.0646	238.2619	247.8893	273.8551	(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	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	27.4520	22.0231	19.8293	14.5278	11.2217	9.1682	10.2368	13.3062	17.2834	22.6768	25.6134	28.2150	(232)	
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-42.8679	-60.1031	-85.9077	-96.0115	-103.0178	-95.9434	-94.7345	-89.6785	-80.6867	-68.4414	-47.0020	-37.0990	(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	-25.2173	-52.9405	-105.0395	-157.5079	-208.0367	-208.9726	-206.5338	-174.9893	-128.4045	-75.6471	-33.6456	-19.9509	(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												2737.9596	(211)	
Space heating fuel - main system 2												0.0000	(213)	
Space heating fuel - secondary												0.0000	(215)	
Efficiency of water heater												79.8000		
Water heating fuel used												2890.8265	(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)												221.5538	(232)	
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation												-2298.3790	(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

3637.9608 (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	2737.9596	0.2100	574.9715 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2890.8265	0.2100	607.0736 (264)
Space and water heating			1182.0451 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	221.5538	0.1443	31.9771 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	0.1347	-121.4448
PV Unit electricity exported	-1396.8855	0.1259	-175.9251
Total			-297.3699 (269)
Total CO2, kg/year			928.5815 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.9800 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2737.9596	1.1300	3093.8943 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2890.8265	1.1300	3266.6339 (278)
Space and water heating			6360.5282 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	221.5538	1.5338	339.8266 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	1.4979	-1350.3395
PV Unit electricity exported	-1396.8855	0.4623	-645.7684
Total			-1996.1080 (283)
Total Primary energy kWh/year			4834.3476 (286)
Target Primary Energy Rate (TPER)			51.9800 (287)

Energy Report



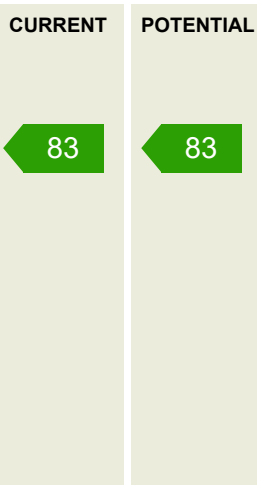
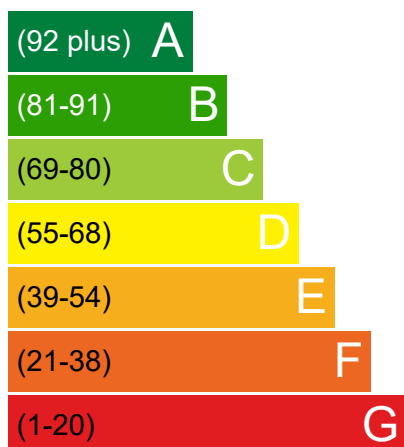
Dwelling Address	
Reference	Block D Flat 4-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	93

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

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

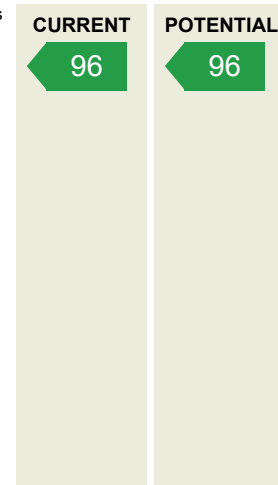
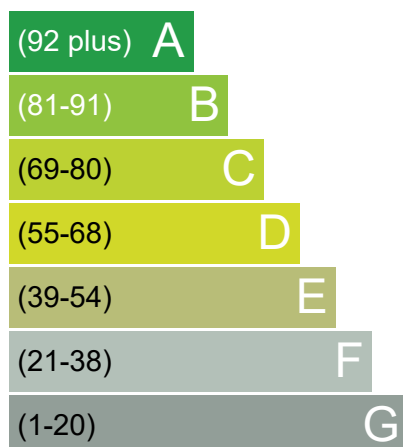
Energy Efficiency Rating

Most energy efficient - lower running costs

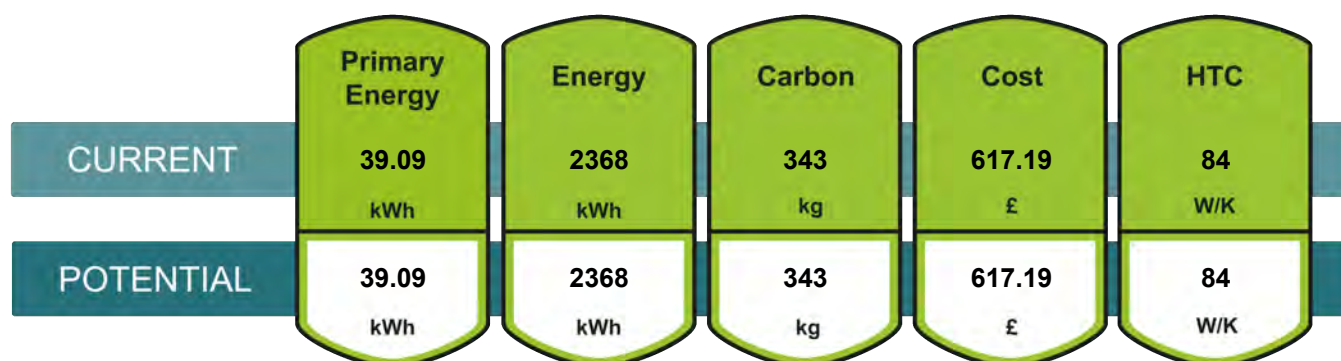


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Floor	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£69	£69	
Heating		£150	£150	
Hot Water		£398	£398	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£617	£617	

Estimated energy use and potential savings



Space Heating

577

kWh per year



Water Heating

899

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

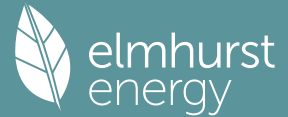
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block D Flat 5				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	84 B	DER	3.63	TER	8.43	
Environmental	97 A	% DER < TER				56.94
CO ₂ Emissions (t/year)	0.31	DFEE	24.07	TFEE	26.19	
Compliance Check	See BREL	% DFEE < TFEE				8.10
% DPER < TPER	11.49	DPER	38.58	TPER	43.59	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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	93.0000 (1b)	2.6000 (2b)	241.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		241.8000 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 241.8000 (5)

2. Ventilation rate

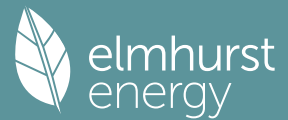
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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											
Opening Type 1			13.1000	1.3258	17.3674		(27)				
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860	190.0000	(29a)				
Total net area of external elements Aum(A, m2)			85.8000				(31)				
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	30.4534		(33)				
Main dwelling											
Party Floor 1			93.0000			30.0000	2790.0000 (32d)				
Party Ceiling 1			93.0000			20.0000	1860.0000 (32b)				
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		18462.9994 (34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							198.5269 (35)				
List of Thermal Bridges											
K1 Element					Length	Psi-value	Total				
E5 Ground floor (normal)					28.0000	0.0000	0.0000				
E16 Corner (normal)					10.4000	0.0000	0.0000				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)				
Point Thermal bridges						(36a) =	0.0000				
Total fabric heat loss					(33) + (36) + (36a) =		30.4534 (37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	41.7714	41.6986	41.6273	41.2922	41.2295	40.9376	40.9376	40.8836	41.0500	41.2295	41.3563	41.4889 (38)
Heat transfer coeff	72.2248	72.1520	72.0807	71.7456	71.6829	71.3910	71.3910	71.3370	71.5034	71.6829	71.8097	71.9423 (39)
Average = Sum(39)m / 12 =												71.7453
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.7766	0.7758	0.7751	0.7715	0.7708	0.7676	0.7676	0.7671	0.7689	0.7708	0.7721	0.7736 (40)
HLP (average)												0.7715
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6646 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	29.0877	28.6486	28.0239	27.0884	26.2454	25.0848	24.2043	25.2810	25.8461	26.9960	28.1916	29.0646 (42b)
Hot water usage for other uses	41.9181	40.3938	38.8695	37.3453	35.8210	34.2967	34.2967	35.8210	37.3453	38.8695	40.3938	41.9181 (42c)
Average daily hot water use (litres/day)												65.0786 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	71.0058	69.0424	66.8935	64.4337	62.0663	59.3815	58.5010	61.1019	63.1913	65.8656	68.5854	70.9827 (44)
Energy conte	104.5328	91.3571	95.5894	84.1665	79.9787	68.6727	64.6453	71.9181	73.2988	84.8744	92.6955	104.2433 (45)
Energy content (annual)												Total = Sum(45)m = 1015.9726
Distribution loss (46)m = 0.15 x (45)m	15.6799	13.7036	14.3384	12.6250	11.9968	10.3009	9.6968	10.7877	10.9948	12.7312	13.9043	15.6365 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364 (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	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (64)
												Total per year (kWh/year) = Sum(64)m = 1656.4746 (64)
12Total per year (kWh/year)												1656 (64)
Electric shower(s)	55.1745	49.1609	53.6818	51.2279	52.1892	49.7834	51.4428	52.1892	51.2279	53.6818	52.6724	55.1745 (64a)
												Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 627.6062 (64a)
Heat gains from water heating, kWh/month	92.0698	81.9740	88.7230	82.9075	83.1593	77.3947	77.8743	80.4791	79.2940	85.1602	86.1046	91.9736 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	132.1206	146.2764	132.1206	136.5246	132.1206	136.5246	132.1206	132.1206	136.5246	132.1206	136.5246	132.1206 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	244.4900	247.0270	240.6338	227.0233	209.8424	193.6949	182.9074	180.3703	186.7636	200.3741	217.5549	233.7024 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230 (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)	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839 (71)
Water heating gains (Table 5)	123.7497	121.9851	119.2513	115.1494	111.7732	107.4927	104.6698	108.1708	110.1306	114.4627	119.5897	123.6204 (72)
Total internal gains	563.3293	578.2574	554.9746	541.6662	516.7052	500.6811	482.6667	483.6307	496.3877	509.9263	536.6381	552.4124 (73)

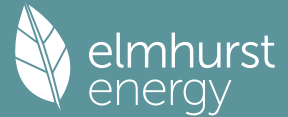
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W			
Northeast				6.2000	11.2829	0.3500	0.0000	0.7700	18.8527 (75)			
Southeast				2.1000	36.7938	0.3500	0.0000	0.7700	20.8235 (77)			
Northwest				4.8000	11.2829	0.3500	0.0000	0.7700	14.5956 (81)			
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	617.6010	681.8124	726.1737	803.2544	854.8545	856.2445	817.2032	758.0131	698.4094	632.3335	603.6664	597.5485 (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	71.0090	71.0806	71.1510	71.4833	71.5458	71.8383	71.8383	71.8927	71.7254	71.5458	71.4195	71.2878
alpha	5.7339	5.7387	5.7434	5.7656	5.7697	5.7892	5.7892	5.7928	5.7817	5.7697	5.7613	5.7525
util living area	0.9894	0.9800	0.9588	0.8832	0.7296	0.5270	0.3834	0.4310	0.6757	0.9126	0.9774	0.9911 (86)

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Living	20.1082	20.2605	20.4769	20.7619	20.9356	20.9914	20.9989	20.9978	20.9678	20.7473	20.3878	20.0757
Non living	19.2273	19.4201	19.6911	20.0349	20.2231	20.2760	20.2810	20.2810	20.2572	20.0249	19.5849	19.1880
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	20.5438	20.2605	20.4769	20.7619	20.9356	20.9914	20.9989	20.9978	20.9678	20.7473	20.3878	20.0757 (87)
Th 2	20.2736	20.2743	20.2750	20.2781	20.2787	20.2815	20.2815	20.2820	20.2804	20.2787	20.2775	20.2763 (88)
util rest of house												
MIT 2	0.9869	0.9755	0.9493	0.8590	0.6855	0.4704	0.3213	0.3647	0.6155	0.8888	0.9715	0.9890 (89)
Living area fraction	19.8565	19.4201	19.6911	20.0349	20.2231	20.2760	20.2810	20.2810	20.2572	20.0249	19.5849	19.3841 (90)
MIT	19.9747	19.5647	19.8263	20.1600	20.3456	20.3991	20.4045	20.4043	20.3794	20.1492	19.7230	19.5254 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9747	19.5647	19.8263	20.1600	20.3456	20.3991	20.4045	20.4043	20.3794	20.1492	19.7230	19.5254 (93)

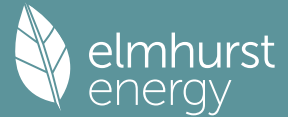
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9857	0.9699	0.9423	0.8546	0.6898	0.4798	0.3320	0.3760	0.6241	0.8839	0.9657	0.9863 (94)
Useful gains	608.7588	661.2792	684.2832	686.4723	589.6892	410.7946	271.2975	285.0298	435.8791	558.8920	582.9572	589.3456 (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	1132.1054	1058.0845	960.5694	807.8530	619.7449	414.0020	271.6060	285.6547	449.0021	684.5152	906.4575	1102.5425 (97)
Space heating kWh	389.3699	266.6532	205.5569	87.3941	22.3615	0.0000	0.0000	0.0000	0.0000	93.4637	232.9202	381.8185 (98a)
Space heating requirement - total per year (kWh/year)												1679.5380
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	389.3699	266.6532	205.5569	87.3941	22.3615	0.0000	0.0000	0.0000	0.0000	93.4637	232.9202	381.8185 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1679.5380
Space heating per m2										(98c) / (4) =		18.0595 (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 %)												305.9030 (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	389.3699	266.6532	205.5569	87.3941	22.3615	0.0000	0.0000	0.0000	0.0000	93.4637	232.9202	381.8185 (98)
Space heating efficiency (main heating system 1)	305.9030	305.9030	305.9030	305.9030	305.9030	0.0000	0.0000	0.0000	0.0000	305.9030	305.9030	305.9030 (210)
Space heating fuel (main heating system)	127.2854	87.1692	67.1968	28.5692	7.3100	0.0000	0.0000	0.0000	0.0000	30.5534	76.1419	124.8169 (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	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (64)
Efficiency of water heater (217)m	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276 (216)
Fuel for water heating, kWh/month	86.1289	76.1357	81.2822	74.1409	72.8225	65.7445	64.5129	68.4542	68.2514	75.4755	78.7630	85.9720 (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	32.8170	26.3270	23.7045	17.3670	13.4147	10.9600	12.2374	15.9066	20.6611	27.1085	30.6190	33.7291 (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												549.0428 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												184.5276
Water heating fuel used												897.6838 (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)												264.8519 (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												2339.1846 (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	549.0428	0.1567	86.0239 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	897.6838	0.1405	126.0868 (264)
Energy for instantaneous electric shower(s)	627.6062	0.1391	87.3139 (264a)
Space and water heating			212.1106 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	264.8519	0.1443	38.2263 (268)
Total CO2, kg/year			337.6508 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.6300 (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	549.0428	1.5800	867.5048 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	897.6838	1.5193	1363.8861 (278)
Energy for instantaneous electric shower(s)	627.6062	1.5143	950.4055 (278a)
Space and water heating			2231.3909 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	264.8519	1.5338	406.2386 (282)
Total Primary energy kWh/year			3588.0350 (286)
Dwelling Primary energy Rate (DPER)			38.5800 (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	93.0000 (1b)	x 2.6000 (2b)	= 241.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	241.8000 (5)

2. Ventilation rate

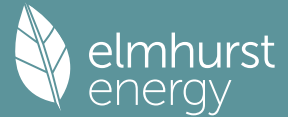
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1241 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3741 (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) = 0.3180 (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	0.4054	0.3974	0.3895	0.3498	0.3418	0.3021	0.3021	0.2941	0.3180	0.3418	0.3577	0.3736 (22b)
Effective ac	0.5822	0.5790	0.5759	0.5612	0.5584	0.5456	0.5456	0.5433	0.5505	0.5584	0.5640	0.5698 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860		(29a)
Total net area of external elements Aum(A, m2)			85.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.0860		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							208.5269 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	
E16 Corner (normal)				10.4000	0.0900	0.9360	

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

Point Thermal bridges (33) + (36) + (36a) = 5.4160 (36)
Total fabric heat loss 0.0000
(33) + (36) + (36a) = 33.5020 (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	46.4540	46.1994	45.9498	44.7775	44.5582	43.5372	43.5372	43.3482	43.9305	44.5582	45.0019	45.4658 (38)
Heat transfer coeff	79.9560	79.7014	79.4518	78.2795	78.0602	77.0392	77.0392	76.8502	77.4325	78.0602	78.5039	78.9678 (39)
Average = Sum(39)m / 12 =												78.2785

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.8597	0.8570	0.8543	0.8417	0.8394	0.8284	0.8284	0.8263	0.8326	0.8394	0.8441	0.8491 (40)
HLP (average)												0.8417
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6646 (42)

Hot water usage for mixer showers 68.8963 67.8609 66.3522 63.4655 61.3351 58.9594 57.6091 59.1064 60.7477 63.2985 66.2473 68.6323 (42a)

Hot water usage for baths 29.7509 29.3090 28.6868 27.5396 26.6806 25.7280 25.2135 25.8314 26.5041 27.5233 28.6942 29.6503 (42b)

Hot water usage for other uses 41.9181 40.3938 38.8695 37.3453 35.8210 34.2967 34.2967 35.8210 37.3453 38.8695 40.3938 41.9181 (42c)

Average daily hot water use (litres/day) 129.2112 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	140.5653	137.5638	133.9086	128.3503	123.8366	118.9841	117.1192	120.7587	124.5971	129.6914	135.3353	140.2008 (44)
Energy conte	222.6211	195.8890	205.8125	175.7052	166.7079	146.3048	141.6456	149.5245	153.6407	175.9900	192.8100	219.5205 (45)
Energy content (annual)												Total = Sum(45)m = 2146.1718
Distribution loss (46)m = 0.15 x (45)m	33.3932	29.3834	30.8719	26.3558	25.0062	21.9457	21.2468	22.4287	23.0461	26.3985	28.9215	32.9281 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.7527 (55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (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	269.2160	237.9747	252.4074	220.7970	213.3028	191.3967	188.2405	196.1194	198.7325	222.5849	237.9018	266.1154 (62)
WWHRS	-31.4965	-27.8558	-29.1690	-24.1531	-22.5098	-19.2618	-18.0548	-19.1995	-19.9290	-23.4941	-26.6159	-30.9132 (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	237.7195	210.1190	223.2384	196.6439	190.7931	172.1349	170.1856	176.9199	178.8035	199.0909	211.2859	235.2022 (64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 2402.1368 (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	111.2974	98.8017	105.7086	94.4954	92.7063	84.7198	84.3731	86.9928	87.1590	95.7926	100.1828	110.2665 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	132.1206	146.2764	132.1206	136.5246	132.1206	136.5246	132.1206	132.1206	136.5246	132.1206	136.5246	132.1206 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	244.4900	247.0270	240.6338	227.0233	209.8424	193.6949	182.9074	180.3703	186.7636	200.3741	217.5549	233.7024 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230 (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)	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839 (71)
Water heating gains (Table 5)	149.5933	147.0263	142.0814	131.2437	124.6053	117.6664	113.4047	116.9258	121.0542	128.7535	139.1428	148.2077 (72)
Total internal gains	592.1729	606.2986	580.8047	560.7605	532.5373	510.8549	491.4016	492.3857	507.3113	527.2171	559.1912	579.9996 (73)

6. Solar gains

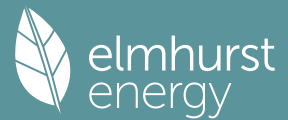
[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g Specific data or Table 6c	FF Specific data or Table 6c	Access factor Table 6d	Gains W					
Northeast	6.2000	11.2829	0.6300	0.7000	0.7700	21.3789 (75)						
Southeast	2.1000	36.7938	0.6300	0.7000	0.7700	23.6138 (77)						
Northwest	4.8000	11.2829	0.6300	0.7000	0.7700	16.5514 (81)						
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843 (83)
Total gains	653.7170	723.7300	774.9445	857.4016	915.9986	914.0638	870.7660	803.5353	736.4039	666.0269	635.2013	631.1840 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	67.3739	67.5891	67.8014	68.8168	69.0101	69.9247	69.9247	70.0967	69.5695	69.0101	68.6201	68.2170
alpha	5.4916	5.5059	5.5201	5.5878	5.6007	5.6616	5.6616	5.6731	5.6380	5.6007	5.5747	5.5478
util living area	0.9898	0.9809	0.9603	0.8871	0.7355	0.5317	0.3881	0.4376	0.6885	0.9187	0.9789	0.9914 (86)
MIT	20.0278	20.1897	20.4232	20.7353	20.9259	20.9900	20.9986	20.9973	20.9613	20.7163	20.3346	20.0076 (87)
Th 2	20.2019	20.2042	20.2065	20.2173	20.2194	20.2288	20.2288	20.2306	20.2252	20.2194	20.2153	20.2110 (88)
util rest of house	0.9872	0.9762	0.9505	0.8617	0.6884	0.4707	0.3207	0.3656	0.6238	0.8944	0.9729	0.9893 (89)
MIT 2	19.0670	19.2733	19.5670	19.9497	20.1566	20.2227	20.2282	20.2294	20.1979	19.9368	19.4666	19.0483 (90)
Living area fraction	19.2323	19.4310	19.7143	20.0848	20.2889	20.3547	20.3608	20.3615	20.3293	20.0709	19.6159	19.2133 (91)
MIT	19.2323	19.4310	19.7143	20.0848	20.2889	20.3547	20.3608	20.3615	20.3293	20.0709	19.6159	19.2133 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2323	19.4310	19.7143	20.0848	20.2889	20.3547	20.3608	20.3615	20.3293	20.0709	19.6159	19.2133 (93)

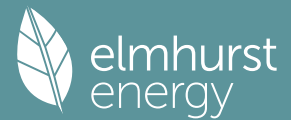
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9831	0.9704	0.9432	0.8569	0.6928	0.4808	0.3323	0.3779	0.6329	0.8891	0.9671	0.9856 (94)
Useful gains	642.6704	702.3322	730.8941	734.7417	634.5780	439.5087	289.3467	303.6745	466.0473	592.1331	614.2774	622.1000 (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	1193.9287	1158.1399	1049.8972	875.5435	670.4528	443.3361	289.7276	304.4439	482.3464	739.3008	982.5491	1185.5664 (97)
Space heating kWh	410.1361	306.3028	237.3383	101.3773	26.6908	0.0000	0.0000	0.0000	0.0000	109.4928	265.1556	419.2190 (98a)
Space heating requirement - total per year (kWh/year)												1875.7127
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	410.1361	306.3028	237.3383	101.3773	26.6908	0.0000	0.0000	0.0000	0.0000	109.4928	265.1556	419.2190 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1875.7127
Space heating per m2										(98c) / (4) =		20.1690 (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	410.1361	306.3028	237.3383	101.3773	26.6908	0.0000	0.0000	0.0000	0.0000	109.4928	265.1556	419.2190 (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)	444.3512	331.8557	257.1379	109.8346	28.9174	0.0000	0.0000	0.0000	0.0000	118.6270	287.2759	454.1918 (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	237.7195	210.1190	223.2384	196.6439	190.7931	172.1349	170.1856	176.9199	178.8035	199.0909	211.2859	235.2022 (64)
Efficiency of water heater (217)m	85.2712	84.9039	84.1974	82.6495	80.8051	79.8000	79.8000	79.8000	79.8000	82.7768	84.5702	79.8000 (216)
Fuel for water heating, kWh/month	278.7806	247.4785	265.1370	237.9253	236.1152	215.7079	213.2652	221.7041	224.0646	240.5153	249.8348	275.6036 (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	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	27.4520	22.0231	19.8293	14.5278	11.2217	9.1682	10.2368	13.3062	17.2834	22.6768	25.6134	28.2150 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-42.8679	-60.1031	-85.9077	-96.0115	-103.0178	-95.9434	-94.7345	-89.6785	-80.6867	-68.4414	-47.0020	-37.0990 (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	-25.2173	-52.9405	-105.0395	-157.5079	-208.0367	-208.9726	-206.5338	-174.9893	-128.4045	-75.6471	-33.6456	-19.9509 (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												2032.1914 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2906.1320 (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)												221.5538 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-2298.3790 (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												2947.4982 (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	2032.1914	0.2100	426.7602 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2906.1320	0.2100	610.2877 (264)
Space and water heating			1037.0479 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	221.5538	0.1443	31.9771 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	0.1347	-121.4448
PV Unit electricity exported	-1396.8855	0.1259	-175.9251
Total			-297.3699 (269)
Total CO2, kg/year			783.5844 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			8.4300 (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	2032.1914	1.1300	2296.3763 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2906.1320	1.1300	3283.9292 (278)
Space and water heating			5580.3055 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	221.5538	1.5338	339.8266 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	1.4979	-1350.3395
PV Unit electricity exported	-1396.8855	0.4623	-645.7684
Total			-1996.1080 (283)
Total Primary energy kWh/year			4054.1249 (286)
Target Primary Energy Rate (TPER)			43.5900 (287)

Energy Report



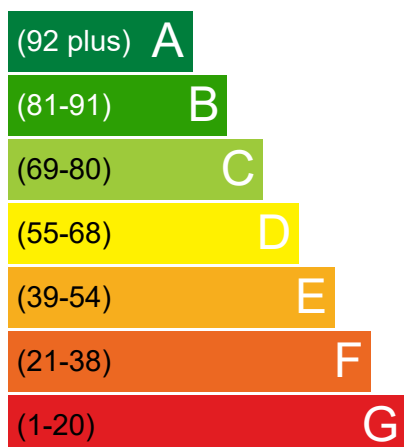
Dwelling Address	
Reference	Block D Flat 5-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	93

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

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

Energy Efficiency Rating

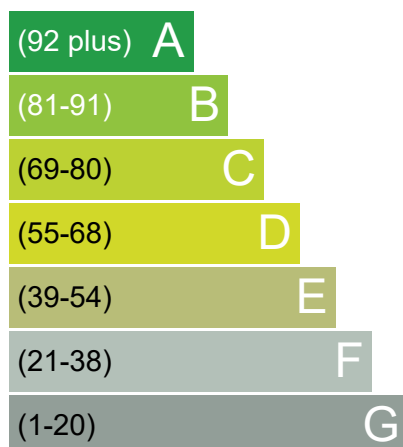
Most energy efficient - lower running costs



CURRENT	POTENTIAL
84	84

Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



CURRENT	POTENTIAL
97	97

Additional ratings for your home

	Primary Energy	Energy	Carbon	Cost	HTC
CURRENT	35.95 kWh	2183 kWh	314 kg	568.95 £	72 W/K
POTENTIAL	35.95 kWh	2183 kWh	314 kg	568.95 £	72 W/K

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£69	£69	
Heating		£103	£103	
Hot Water		£397	£397	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£569	£569	

Estimated energy use and potential savings



Space Heating
393
kWh per year



Water Heating
897
kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

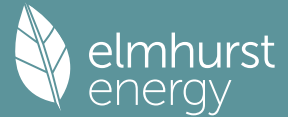
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block D Flat 6				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	84 B	DER	3.95	TER	9.44	
Environmental	97 A	% DER < TER				58.16
CO ₂ Emissions (t/year)	0.27	DFEE	23.30	TFEE	25.89	
Compliance Check	See BREL	% DFEE < TFEE				9.99
% DPER < TPER	13.85	DPER	42.16	TPER	48.94	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		
Dwelling volume			

2. Ventilation rate

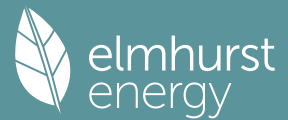
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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	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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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											
Opening Type 1			13.1000	1.3258	17.3674		(27)				
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660	190.0000	6402.9997 (29a)				
Total net area of external elements Aum(A, m2)			46.8000				(31)				
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.4334		(33)				
Main dwelling											
Party Floor 1			74.0000			30.0000	2220.0000 (32d)				
Party Ceiling 1			74.0000			20.0000	1480.0000 (32b)				
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		10102.9997 (34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							136.5270 (35)				
List of Thermal Bridges											
K1 Element					Length	Psi-value	Total				
E5 Ground floor (normal)					28.0000	0.0000	0.0000				
E16 Corner (normal)					10.4000	0.0000	0.0000				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)				
Point Thermal bridges						(36a) =	0.0000				
Total fabric heat loss					(33) + (36) + (36a) =		23.4334 (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

Full SAP Calculation Printout



(38)m	33.2374	33.1795	33.1228	32.8561	32.8062	32.5740	32.5740	32.5310	32.6635	32.8062	32.9072	33.0127 (38)
Heat transfer coeff	56.6709	56.6130	56.5562	56.2895	56.2397	56.0074	56.0074	55.9644	56.0969	56.2397	56.3406	56.4461 (39)
Average = Sum(39)m / 12 =												56.2893
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.7658	0.7650	0.7643	0.7607	0.7600	0.7569	0.7569	0.7563	0.7581	0.7600	0.7614	0.7628 (40)
HLP (average)												0.7607
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3392 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	26.7937	26.3892	25.8138	24.9521	24.1756	23.1065	22.2955	23.2872	23.8077	24.8670	25.9683	26.7724	(42b)
Hot water usage for other uses	38.5857	37.1826	35.7795	34.3763	32.9732	31.5701	31.5701	32.9732	34.3763	35.7795	37.1826	38.5857	(42c)
Average daily hot water use (litres/day)													59.9220 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	65.3794	63.5718	61.5933	59.3285	57.1488	54.6766	53.8656	56.2605	58.1841	60.6464	63.1509	65.3581	(44)
Energy conte	96.2498	84.1184	88.0155	77.4978	73.6420	63.2317	59.5230	66.2196	67.4906	78.1491	85.3505	95.9832	(45)
Energy content (annual)													Total = Sum(45)m = 935.4712
Distribution loss (46)m = 0.15 x (45)m	14.4375	12.6178	13.2023	11.6247	11.0463	9.4848	8.9285	9.9329	10.1236	11.7224	12.8026	14.3975	(46)
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8600 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(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	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820	(64)
													Total per year (kWh/year) = Sum(64)m = 1575.9732 (64)
12Total per year (kWh/year)													1576 (64)
Electric shower(s)	50.8051	45.2677	49.4306	47.1711	48.0562	45.8410	47.3690	48.0562	47.1711	49.4306	48.5012	50.8051	(64a)
													Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 577.9048 (64a)
Heat gains from water heating, kWh/month	88.2234	78.5938	85.1419	79.6760	80.0191	74.6000	75.1527	77.5511	76.3486	81.8613	82.6195	88.1347	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.6419	118.0678	106.6419	110.1966	106.6419	110.1966	106.6419	106.6419	110.1966	106.6419	110.1966	106.6419	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	(69)
Pumps, fans	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)	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	(71)
Water heating gains (Table 5)	118.5798	116.9551	114.4380	110.6611	107.5525	103.6111	101.0117	104.2354	106.0397	110.0286	114.7494	118.4607	(72)
Total internal gains	489.7569	501.7004	482.3589	470.6440	449.4732	435.4516	420.1884	421.2698	432.0274	443.9542	466.7372	480.5287	(73)

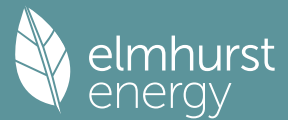
6. Solar gains

[Jan]			Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W				
Northeast			6.2000	11.2829	0.3500	0.0000	0.7700	18.8527 (75)				
Southeast			2.1000	36.7938	0.3500	0.0000	0.7700	20.8235 (77)				
Northwest			4.8000	11.2829	0.3500	0.0000	0.7700	14.5956 (81)				
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	544.0286	605.2554	653.5580	732.2323	787.6225	791.0150	754.7249	695.6522	634.0491	566.3614	533.7655	525.6648 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	49.5208	49.5715	49.6213	49.8563	49.9005	50.1074	50.1074	50.1459	50.0275	49.9005	49.8111	49.7180	
alpha	4.3014	4.3048	4.3081	4.3238	4.3267	4.3405	4.3405	4.3431	4.3352	4.3267	4.3207	4.3145	
util living area	0.9585	0.9349	0.8909	0.7816	0.6213	0.4451	0.3248	0.3669	0.5803	0.8251	0.9301	0.9635	(86)

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Living	19.9223	20.1233	20.3966	20.7237	20.9144	20.9837	20.9967	20.9945	20.9514	20.7012	20.2720	19.8784
Non living	19.0213	19.2722	19.6093	19.9991	20.2089	20.2788	20.2891	20.2882	20.2506	19.9820	19.4635	18.9682
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	20.4487	20.1233	20.3966	20.7237	20.9144	20.9837	20.9967	20.9945	20.9514	20.7012	20.2720	20.0353 (87)
Th 2	20.2831	20.2837	20.2844	20.2875	20.2881	20.2909	20.2909	20.2914	20.2898	20.2881	20.2869	20.2857 (88)
util rest of house												
	0.9522	0.9255	0.8756	0.7545	0.5824	0.3982	0.2732	0.3117	0.5287	0.7962	0.9185	0.9579 (89)
MIT 2	19.7800	19.2722	19.6093	19.9991	20.2089	20.2788	20.2891	20.2882	20.2506	19.9820	19.4635	19.2056 (90)
Living area fraction									FLA = Living area / (4) =			0.4324 (91)
MIT	20.0692	19.6403	19.9498	20.3124	20.5140	20.5836	20.5951	20.5936	20.5536	20.2930	19.8131	19.5644 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0692	19.6403	19.9498	20.3124	20.5140	20.5836	20.5951	20.5936	20.5536	20.2930	19.8131	19.5644 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9501	0.9157	0.8676	0.7555	0.5950	0.4177	0.2954	0.3354	0.5483	0.7964	0.9096	0.9512 (94)
Useful gains	516.9047	554.2511	567.0396	553.2222	468.6187	330.4337	222.9500	233.3022	347.6226	451.0670	485.5066	499.9975 (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	893.6531	834.4901	760.6674	642.4005	495.6939	335.1265	223.7551	234.6942	362.0285	545.1312	716.2634	867.2602 (97)
Space heating kWh	280.3008	188.3206	144.0590	64.2084	20.1440	0.0000	0.0000	0.0000	0.0000	69.9837	166.1449	273.2435 (98a)
Space heating requirement - total per year (kWh/year)												1206.4048
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	280.3008	188.3206	144.0590	64.2084	20.1440	0.0000	0.0000	0.0000	0.0000	69.9837	166.1449	273.2435 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1206.4048
Space heating per m2										(98c) / (4) =		16.3028 (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 %)												302.9676 (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	280.3008	188.3206	144.0590	64.2084	20.1440	0.0000	0.0000	0.0000	0.0000	69.9837	166.1449	273.2435 (98)
Space heating efficiency (main heating system 1)	302.9676	302.9676	302.9676	302.9676	302.9676	0.0000	0.0000	0.0000	0.0000	302.9676	302.9676	302.9676 (210)
Space heating fuel (main heating system)	92.5184	62.1587	47.5493	21.1932	6.6489	0.0000	0.0000	0.0000	0.0000	23.0994	54.8392	90.1890 (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	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820 (64)
Efficiency of water heater (217)m	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715 (216)
Fuel for water heating, kWh/month	81.7980	72.3525	77.3270	70.6634	69.5226	62.9173	61.8564	65.4924	65.2298	71.9698	74.9272	81.6532 (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	25.5207	20.4737	18.4343	13.5057	10.4322	8.5232	9.5166	12.3701	16.0675	21.0814	23.8114	26.2300 (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												398.1960 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												184.1715
Water heating fuel used												855.7096 (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)												205.9667 (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												2037.7772 (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	398.1960	0.1565	62.3323 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	855.7096	0.1404	120.1430 (264)
Energy for instantaneous electric shower(s)	577.9048	0.1391	80.3993 (264a)
Space and water heating			182.4753 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	205.9667	0.1443	29.7274 (268)
Total CO2, kg/year			292.6020 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.9500 (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	398.1960	1.5795	628.9471 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	855.7096	1.5191	1299.9327 (278)
Energy for instantaneous electric shower(s)	577.9048	1.5143	875.1410 (278a)
Space and water heating			1928.8799 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	205.9667	1.5338	315.9186 (282)
Total Primary energy kWh/year			3119.9395 (286)
Dwelling Primary energy Rate (DPER)			42.1600 (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	74.0000 (1b)	x 2.6000 (2b)	= 192.4000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	192.4000 (5)

2. Ventilation rate

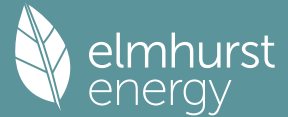
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1559 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4059 (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) = 0.3450 (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	0.4399	0.4313	0.4227	0.3795	0.3709	0.3278	0.3278	0.3192	0.3450	0.3709	0.3882	0.4054 (22b)
Effective ac	0.5968	0.5930	0.5893	0.5720	0.5688	0.5537	0.5537	0.5509	0.5595	0.5688	0.5753	0.5822 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660		(29a)
Total net area of external elements Aum(A, m2)			46.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.0660		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							146.5270 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value		Total
E5 Ground floor (normal)				28.0000	0.1600		4.4800
E16 Corner (normal)				10.4000	0.0900		0.9360

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Thermal bridges (Sum(L x Psi) calculated using Appendix K)
 Point Thermal bridges
 Total fabric heat loss

(33) + (36) + (36a) =
 5.4160 (36)
 0.0000
 26.4820 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	37.8898	37.6513	37.4174	36.3190	36.1135	35.1569	35.1569	34.9797	35.5254	36.1135	36.5293	36.9639	(38)
Heat transfer coeff	64.3718	64.1333	63.8994	62.8010	62.5955	61.6389	61.6389	61.4617	62.0074	62.5955	63.0113	63.4459	(39)
Average = Sum(39)m / 12 =												62.8000	
HLP	0.8699	0.8667	0.8635	0.8487	0.8459	0.8330	0.8330	0.8306	0.8379	0.8459	0.8515	0.8574	(40)
HLP (average)												0.8486	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3392 (42)
Hot water usage for mixer showers													
63.4403	62.4869	61.0976	58.4395	56.4779	54.2903	53.0469	54.4256	55.9370	58.2858	61.0010	63.1972	(42a)	
Hot water usage for baths													
27.4046	26.9976	26.4245	25.3677	24.5764	23.6990	23.2251	23.7942	24.4139	25.3527	26.4313	27.3120	(42b)	
Hot water usage for other uses													
38.5857	37.1826	35.7795	34.3763	32.9732	31.5701	31.5701	32.9732	34.3763	35.7795	37.1826	38.5857	(42c)	
Average daily hot water use (litres/day)											118.9761	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.4306	126.6671	123.3016	118.1836	114.0275	109.5594	107.8421	111.1931	114.7272	119.4180	124.6149	129.0949	(44)
Energy content	204.9864	180.3722	189.5099	161.7874	153.5030	134.7161	130.4256	137.6802	141.4701	162.0491	177.5367	202.1314	(45)
Energy content (annual)										Total = Sum(45)m =		1976.1681	
Distribution loss (46)m = 0.15 x (45)m	30.7480	27.0558	28.4265	24.2681	23.0254	20.2074	19.5638	20.6520	21.2205	24.3074	26.6305	30.3197	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage													
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	(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													
251.5813	222.4579	236.1048	206.8792	200.0979	179.8079	177.0205	184.2751	186.5620	208.6440	222.6285	248.7263	(62)	
WWHRS	-29.0022	-25.6498	-26.8590	-22.2403	-20.7272	-17.7364	-16.6250	-17.6791	-18.3508	-21.6335	-24.5082	-28.4652	(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	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2255.3088	(64)
Electric shower(s)												2255	(64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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													
105.4339	93.6423	100.2880	89.8678	88.3157	80.8666	80.6424	83.0546	83.1123	91.1572	95.1044	104.4846	(65)	

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

Metabolic gains (Table 5), Watts													
(66)m	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
106.6419	118.0678	106.6419	110.1966	106.6419	110.1966	106.6419	106.6419	110.1966	106.6419	110.1966	106.6419	106.6419	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383	197.3383	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	(71)
Water heating gains (Table 5)													
141.7122	139.3487	134.7956	124.8164	118.7038	112.3147	108.3904	111.6325	115.4337	122.5232	132.0895	140.4363	140.4363	(72)
Total internal gains	515.8893	527.0940	505.7165	487.7993	463.6246	444.1552	427.5671	428.6670	441.4214	459.4488	487.0773	505.5044	(73)

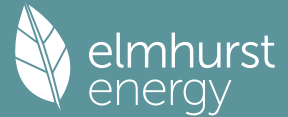
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W				
Northeast				6.2000	11.2829	0.6300	0.7000	0.7700	21.3789 (75)				
Southeast				2.1000	36.7938	0.6300	0.7000	0.7700	23.6138 (77)				
Northwest				4.8000	11.2829	0.6300	0.7000	0.7700	16.5514 (81)				
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843	(83)
Total gains	577.4335	644.5254	699.8563	784.4404	847.0859	847.3641	806.9315	739.8166	670.5140	598.2586	563.0874	556.6887	(84)

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)
 21.0000 (85)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	46.7898	46.9638	47.1357	47.9601	48.1176	48.8644	48.8644	49.0052	48.5740	48.1176	47.8001	47.4727
alpha	4.1193	4.1309	4.1424	4.1973	4.2078	4.2576	4.2576	4.2670	4.2383	4.2078	4.1867	4.1648
util living area	0.9627	0.9411	0.8998	0.7945	0.6356	0.4558	0.3339	0.3782	0.6001	0.8405	0.9375	0.9669 (86)
MIT	19.7905	20.0066	20.3072	20.6797	20.8973	20.9805	20.9959	20.9932	20.9401	20.6524	20.1849	19.7662 (87)
Th 2	20.1932	20.1959	20.1986	20.2114	20.2137	20.2249	20.2249	20.2269	20.2206	20.2137	20.2089	20.2039 (88)
util rest of house	0.9564	0.9316	0.8839	0.7656	0.5927	0.4037	0.2760	0.3163	0.5428	0.8103	0.9258	0.9613 (89)
MIT 2	18.7856	19.0572	19.4297	19.8810	20.1208	20.2110	20.2228	20.2233	20.1736	19.8615	19.2931	18.7629 (90)
Living area fraction	19.2202	19.4678	19.8092	20.2264	20.4566	20.5437	20.5571	20.5562	20.5051	20.2035	19.6788	19.1968 (92)
MIT	19.2202	19.4678	19.8092	20.2264	20.4566	20.5437	20.5571	20.5562	20.5051	20.2035	19.6788	19.1968 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2202	19.4678	19.8092	20.2264	20.4566	20.5437	20.5571	20.5562	20.5051	20.2035	19.6788	19.1968 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9471	0.9214	0.8752	0.7662	0.6063	0.4254	0.3010	0.3429	0.5643	0.8099	0.9166	0.9525 (94)
Useful gains	546.8594	593.8585	612.5184	601.0073	513.5607	360.4372	242.8661	253.6506	378.3588	484.5393	516.1522	530.2524 (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	960.4395	934.2780	850.4482	711.3089	548.1215	366.3646	243.9119	255.4468	397.1615	601.1376	792.6051	951.4845 (97)
Space heating kWh	307.7036	228.7619	177.0198	79.4172	25.7132	0.0000	0.0000	0.0000	0.0000	86.7491	199.0460	313.3967 (98a)
Space heating requirement - total per year (kWh/year)												1417.8076
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	307.7036	228.7619	177.0198	79.4172	25.7132	0.0000	0.0000	0.0000	0.0000	86.7491	199.0460	313.3967 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1417.8076
Space heating per m2										(98c) / (4) =		19.1596 (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	307.7036	228.7619	177.0198	79.4172	25.7132	0.0000	0.0000	0.0000	0.0000	86.7491	199.0460	313.3967 (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)	333.3734	247.8460	191.7874	86.0425	27.8583	0.0000	0.0000	0.0000	0.0000	93.9860	215.6512	339.5414 (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	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611 (64)
Efficiency of water heater (217)m	84.7863	84.3981	83.6871	82.3090	80.8271	79.8000	79.8000	79.8000	79.8000	82.4479	84.0702	79.8000 (216)
Fuel for water heating, kWh/month	262.5176	233.1903	250.0336	224.3242	221.9190	203.0972	200.9969	208.7670	210.7910	226.8226	235.6605	259.5880 (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	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	22.1581	17.7760	16.0053	11.7262	9.0577	7.4002	8.2627	10.7402	13.9504	18.3037	20.6740	22.7739 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-34.6470	-48.8615	-70.2632	-79.0451	-85.2832	-79.6290	-78.6490	-74.2251	-66.4236	-55.8927	-38.0974	-29.9529 (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)	-19.5283	-41.0871	-81.6732	-122.6800	-162.2226	-162.9923	-161.0698	-136.3708	-99.9500	-58.7583	-26.0738	-15.4417 (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												1536.0862 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2737.7078 (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)												178.8284 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1828.8177 (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												2709.8047 (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	1536.0862	0.2100	322.5781 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2737.7078	0.2100	574.9186 (264)
Space and water heating			897.4967 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	178.8284	0.1443	25.8105 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-740.9697	0.1346	-99.7152
PV Unit electricity exported	-1087.8480	0.1259	-136.9534
Total			-236.6686 (269)
Total CO2, kg/year			698.5678 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.4400 (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	1536.0862	1.1300	1735.7774 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2737.7078	1.1300	3093.6098 (278)
Space and water heating			4829.3872 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	178.8284	1.5338	274.2930 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-740.9697	1.4974	-1109.4998
PV Unit electricity exported	-1087.8480	0.4621	-502.7132
Total			-1612.2130 (283)
Total Primary energy kWh/year			3621.5680 (286)
Target Primary Energy Rate (TPER)			48.9400 (287)

Energy Report



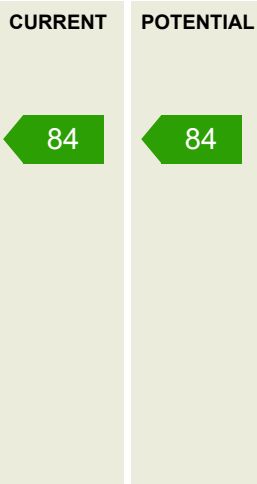
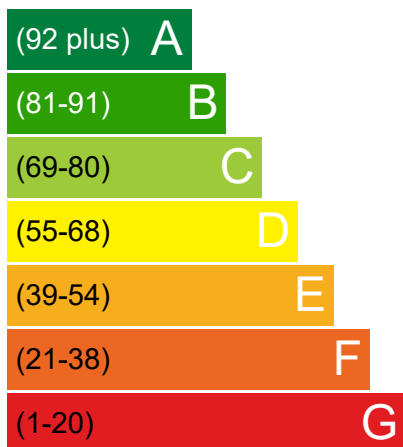
Dwelling Address	
Reference	Block D Flat 6-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	74

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

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

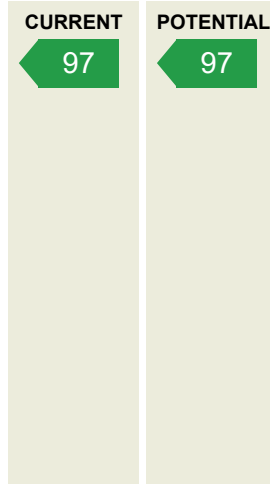
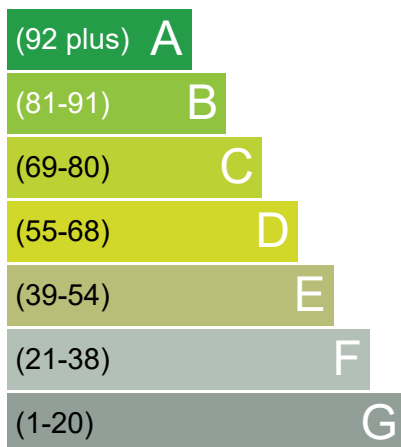
Energy Efficiency Rating

Most energy efficient - lower running costs

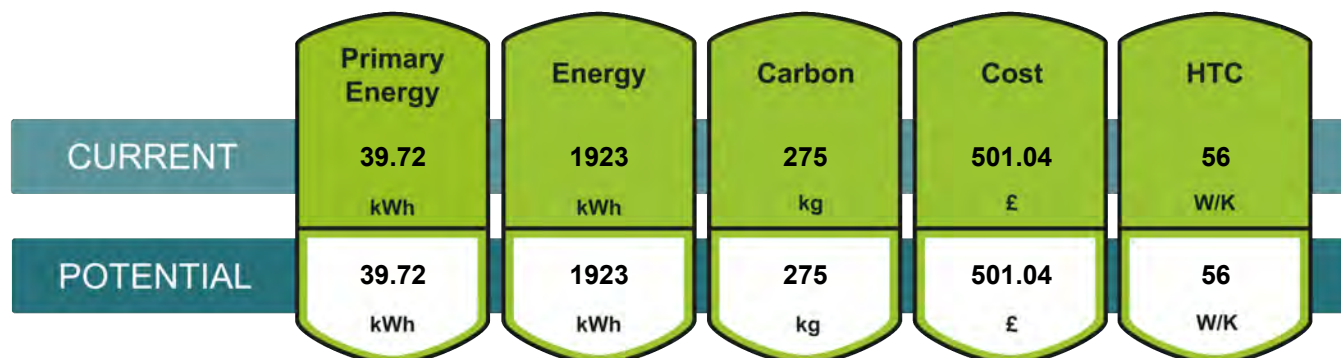


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£54	£54	
Heating		£74	£74	
Hot Water		£374	£374	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£501	£501	

Estimated energy use and potential savings



Space Heating

282

kWh per year



Water Heating

856

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block D Flat 7				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	84 B	DER	3.95	TER	9.44	
Environmental	97 A	% DER < TER				58.16
CO ₂ Emissions (t/year)	0.27	DFEE	23.30	TFEE	25.89	
Compliance Check	See BREL	% DFEE < TFEE				9.99
% DPER < TPER	13.85	DPER	42.16	TPER	48.94	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		192.4000 (1b) - (3b)
Dwelling volume			192.4000 (5)

2. Ventilation rate

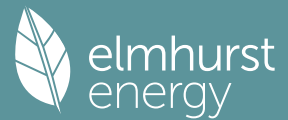
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K					
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K					
Opening Type 1			13.1000	1.3258	17.3674			(27)				
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660	190.0000	6402.9997	(29a)				
Total net area of external elements Aum(A, m2)			46.8000					(31)				
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.4334			(33)				
Main dwelling												
Party Floor 1			74.0000			30.0000	2220.0000	(32d)				
Party Ceiling 1			74.0000			20.0000	1480.0000	(32b)				
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	10102.9997	(34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							136.5270	(35)				
List of Thermal Bridges												
K1 Element				Length	Psi-value	Total						
E5 Ground floor (normal)				28.0000	0.0000	0.0000						
E16 Corner (normal)				10.4000	0.0000	0.0000						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000	(36)				
Point Thermal bridges						(36a) =	0.0000					
Total fabric heat loss						(33) + (36) + (36a) =	23.4334	(37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	33.2374	33.1795	33.1228	32.8561	32.8062	32.5740	32.5740	32.5310	32.6635	32.8062	32.9072	33.0127 (38)
Heat transfer coeff	56.6709	56.6130	56.5562	56.2895	56.2397	56.0074	56.0074	55.9644	56.0969	56.2397	56.3406	56.4461 (39)
Average = Sum(39)m / 12 =												56.2893
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.7658	0.7650	0.7643	0.7607	0.7600	0.7569	0.7569	0.7563	0.7581	0.7600	0.7614	0.7628 (40)
HLP (average)												0.7607
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3392 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	26.7937	26.3892	25.8138	24.9521	24.1756	23.1065	22.2955	23.2872	23.8077	24.8670	25.9683	26.7724	(42b)
Hot water usage for other uses	38.5857	37.1826	35.7795	34.3763	32.9732	31.5701	31.5701	32.9732	34.3763	35.7795	37.1826	38.5857	(42c)
Average daily hot water use (litres/day)													59.9220 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	65.3794	63.5718	61.5933	59.3285	57.1488	54.6766	53.8656	56.2605	58.1841	60.6464	63.1509	65.3581	(44)
Energy conte	96.2498	84.1184	88.0155	77.4978	73.6420	63.2317	59.5230	66.2196	67.4906	78.1491	85.3505	95.9832	(45)
Energy content (annual)													Total = Sum(45)m = 935.4712
Distribution loss (46)m = 0.15 x (45)m	14.4375	12.6178	13.2023	11.6247	11.0463	9.4848	8.9285	9.9329	10.1236	11.7224	12.8026	14.3975	(46)
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8600 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(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	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820	(64)
													Total per year (kWh/year) = Sum(64)m = 1575.9732 (64)
12Total per year (kWh/year)													1576 (64)
Electric shower(s)	50.8051	45.2677	49.4306	47.1711	48.0562	45.8410	47.3690	48.0562	47.1711	49.4306	48.5012	50.8051	(64a)
													Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 577.9048 (64a)
Heat gains from water heating, kWh/month	88.2234	78.5938	85.1419	79.6760	80.0191	74.6000	75.1527	77.5511	76.3486	81.8613	82.6195	88.1347	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.6419	118.0678	106.6419	110.1966	106.6419	110.1966	106.6419	106.6419	110.1966	106.6419	110.1966	106.6419	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	(69)
Pumps, fans	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)	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	(71)
Water heating gains (Table 5)	118.5798	116.9551	114.4380	110.6611	107.5525	103.6111	101.0117	104.2354	106.0397	110.0286	114.7494	118.4607	(72)
Total internal gains	489.7569	501.7004	482.3589	470.6440	449.4732	435.4516	420.1884	421.2698	432.0274	443.9542	466.7372	480.5287	(73)

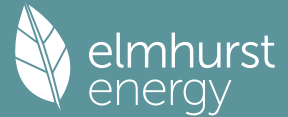
6. Solar gains

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	49.5208	49.5715	49.6213	49.8563	49.9005	50.1074	50.1074	50.1459	50.0275	49.9005	49.8111	49.7180	
alpha	4.3014	4.3048	4.3081	4.3238	4.3267	4.3405	4.3405	4.3431	4.3352	4.3267	4.3207	4.3145	
util living area	0.9585	0.9349	0.8909	0.7816	0.6213	0.4451	0.3248	0.3669	0.5803	0.8251	0.9301	0.9635	(86)

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Living	19.9223	20.1233	20.3966	20.7237	20.9144	20.9837	20.9967	20.9945	20.9514	20.7012	20.2720	19.8784
Non living	19.0213	19.2722	19.6093	19.9991	20.2089	20.2788	20.2891	20.2882	20.2506	19.9820	19.4635	18.9682
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	20.4487	20.1233	20.3966	20.7237	20.9144	20.9837	20.9967	20.9945	20.9514	20.7012	20.2720	20.0353 (87)
Th 2	20.2831	20.2837	20.2844	20.2875	20.2881	20.2909	20.2909	20.2914	20.2898	20.2881	20.2869	20.2857 (88)
util rest of house												
	0.9522	0.9255	0.8756	0.7545	0.5824	0.3982	0.2732	0.3117	0.5287	0.7962	0.9185	0.9579 (89)
MIT 2	19.7800	19.2722	19.6093	19.9991	20.2089	20.2788	20.2891	20.2882	20.2506	19.9820	19.4635	19.2056 (90)
Living area fraction									FLA = Living area / (4) =			0.4324 (91)
MIT	20.0692	19.6403	19.9498	20.3124	20.5140	20.5836	20.5951	20.5936	20.5536	20.2930	19.8131	19.5644 (92)
Temperature adjustment												0.0000
adjusted MIT	20.0692	19.6403	19.9498	20.3124	20.5140	20.5836	20.5951	20.5936	20.5536	20.2930	19.8131	19.5644 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9501	0.9157	0.8676	0.7555	0.5950	0.4177	0.2954	0.3354	0.5483	0.7964	0.9096	0.9512 (94)
Useful gains	516.9047	554.2511	567.0396	553.2222	468.6187	330.4337	222.9500	233.3022	347.6226	451.0670	485.5066	499.9975 (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	893.6531	834.4901	760.6674	642.4005	495.6939	335.1265	223.7551	234.6942	362.0285	545.1312	716.2634	867.2602 (97)
Space heating kWh	280.3008	188.3206	144.0590	64.2084	20.1440	0.0000	0.0000	0.0000	0.0000	69.9837	166.1449	273.2435 (98a)
Space heating requirement - total per year (kWh/year)												1206.4048
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	280.3008	188.3206	144.0590	64.2084	20.1440	0.0000	0.0000	0.0000	0.0000	69.9837	166.1449	273.2435 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1206.4048
Space heating per m2										(98c) / (4) =		16.3028 (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 %)												302.9676 (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	280.3008	188.3206	144.0590	64.2084	20.1440	0.0000	0.0000	0.0000	0.0000	69.9837	166.1449	273.2435 (98)
Space heating efficiency (main heating system 1)	302.9676	302.9676	302.9676	302.9676	302.9676	0.0000	0.0000	0.0000	0.0000	302.9676	302.9676	302.9676 (210)
Space heating fuel (main heating system)	92.5184	62.1587	47.5493	21.1932	6.6489	0.0000	0.0000	0.0000	0.0000	23.0994	54.8392	90.1890 (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	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820 (64)
Efficiency of water heater (217)m	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715	184.1715 (216)
Fuel for water heating, kWh/month	81.7980	72.3525	77.3270	70.6634	69.5226	62.9173	61.8564	65.4924	65.2298	71.9698	74.9272	81.6532 (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	25.5207	20.4737	18.4343	13.5057	10.4322	8.5232	9.5166	12.3701	16.0675	21.0814	23.8114	26.2300 (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												398.1960 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												184.1715
Water heating fuel used												855.7096 (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)												205.9667 (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												2037.7772 (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	398.1960	0.1565	62.3323 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	855.7096	0.1404	120.1430 (264)
Energy for instantaneous electric shower(s)	577.9048	0.1391	80.3993 (264a)
Space and water heating			182.4753 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	205.9667	0.1443	29.7274 (268)
Total CO2, kg/year			292.6020 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.9500 (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	398.1960	1.5795	628.9471 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	855.7096	1.5191	1299.9327 (278)
Energy for instantaneous electric shower(s)	577.9048	1.5143	875.1410 (278a)
Space and water heating			1928.8799 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	205.9667	1.5338	315.9186 (282)
Total Primary energy kWh/year			3119.9395 (286)
Dwelling Primary energy Rate (DPER)			42.1600 (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	74.0000 (1b)	x 2.6000 (2b)	= 192.4000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	192.4000 (5)

2. Ventilation rate

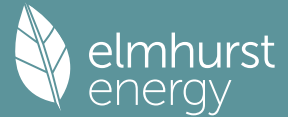
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1559 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4059 (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) = 0.3450 (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	0.4399	0.4313	0.4227	0.3795	0.3709	0.3278	0.3278	0.3192	0.3450	0.3709	0.3882	0.4054 (22b)
Effective ac	0.5968	0.5930	0.5893	0.5720	0.5688	0.5537	0.5537	0.5509	0.5595	0.5688	0.5753	0.5822 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	46.8000	13.1000	33.7000	0.1800	6.0660		(29a)
Total net area of external elements Aum(A, m2)			46.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		21.0660		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							146.5270 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	
E16 Corner (normal)				10.4000	0.0900	0.9360	

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Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

(33) + (36) + (36a) = 26.4820 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	37.8898	37.6513	37.4174	36.3190	36.1135	35.1569	35.1569	34.9797	35.5254	36.1135	36.5293	36.9639	(38)
Heat transfer coeff	64.3718	64.1333	63.8994	62.8010	62.5955	61.6389	61.6389	61.4617	62.0074	62.5955	63.0113	63.4459	(39)
Average = Sum(39)m / 12 =												62.8000	
HLP	0.8699	0.8667	0.8635	0.8487	0.8459	0.8330	0.8330	0.8306	0.8379	0.8459	0.8515	0.8574	(40)
HLP (average)												0.8486	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3392 (42)
Hot water usage for mixer showers													
63.4403	62.4869	61.0976	58.4395	56.4779	54.2903	53.0469	54.4256	55.9370	58.2858	61.0010	63.1972	(42a)	
Hot water usage for baths													
27.4046	26.9976	26.4245	25.3677	24.5764	23.6990	23.2251	23.7942	24.4139	25.3527	26.4313	27.3120	(42b)	
Hot water usage for other uses													
38.5857	37.1826	35.7795	34.3763	32.9732	31.5701	31.5701	32.9732	34.3763	35.7795	37.1826	38.5857	(42c)	
Average daily hot water use (litres/day)											118.9761	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	129.4306	126.6671	123.3016	118.1836	114.0275	109.5594	107.8421	111.1931	114.7272	119.4180	124.6149	129.0949	(44)
Energy content	204.9864	180.3722	189.5099	161.7874	153.5030	134.7161	130.4256	137.6802	141.4701	162.0491	177.5367	202.1314	(45)
Energy content (annual)										Total = Sum(45)m =		1976.1681	
Distribution loss (46)m = 0.15 x (45)m	30.7480	27.0558	28.4265	24.2681	23.0254	20.2074	19.5638	20.6520	21.2205	24.3074	26.6305	30.3197	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.7527	(55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	(56)
If cylinder contains dedicated solar storage													
23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	(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													
251.5813	222.4579	236.1048	206.8792	200.0979	179.8079	177.0205	184.2751	186.5620	208.6440	222.6285	248.7263	(62)	
WWHRS	-29.0022	-25.6498	-26.8590	-22.2403	-20.7272	-17.7364	-16.6250	-17.6791	-18.3508	-21.6335	-24.5082	-28.4652	(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	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2255.3088	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
												0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000	(64a)
Heat gains from water heating, kWh/month													
105.4339	93.6423	100.2880	89.8678	88.3157	80.8666	80.6424	83.0546	83.1123	91.1572	95.1044	104.4846	(65)	

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

Metabolic gains (Table 5), Watts													
(66)m	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
106.6419	118.0678	106.6419	110.1966	106.6419	110.1966	106.6419	106.6419	110.1966	106.6419	110.1966	106.6419	106.6419	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383	197.3383	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	(71)
Water heating gains (Table 5)													
141.7122	139.3487	134.7956	124.8164	118.7038	112.3147	108.3904	111.6325	115.4337	122.5232	132.0895	140.4363	140.4363	(72)
Total internal gains	515.8893	527.0940	505.7165	487.7993	463.6246	444.1552	427.5671	428.6670	441.4214	459.4488	487.0773	505.5044	(73)

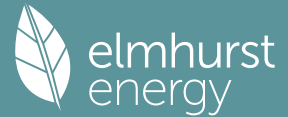
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W				
Northeast				6.2000	11.2829	0.6300	0.7000	0.7700	21.3789 (75)				
Southeast				2.1000	36.7938	0.6300	0.7000	0.7700	23.6138 (77)				
Northwest				4.8000	11.2829	0.6300	0.7000	0.7700	16.5514 (81)				
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843	(83)
Total gains	577.4335	644.5254	699.8563	784.4404	847.0859	847.3641	806.9315	739.8166	670.5140	598.2586	563.0874	556.6887	(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)	

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	46.7898	46.9638	47.1357	47.9601	48.1176	48.8644	48.8644	49.0052	48.5740	48.1176	47.8001	47.4727
alpha	4.1193	4.1309	4.1424	4.1973	4.2078	4.2576	4.2576	4.2670	4.2383	4.2078	4.1867	4.1648
util living area	0.9627	0.9411	0.8998	0.7945	0.6356	0.4558	0.3339	0.3782	0.6001	0.8405	0.9375	0.9669 (86)
MIT	19.7905	20.0066	20.3072	20.6797	20.8973	20.9805	20.9959	20.9932	20.9401	20.6524	20.1849	19.7662 (87)
Th 2	20.1932	20.1959	20.1986	20.2114	20.2137	20.2249	20.2249	20.2269	20.2206	20.2137	20.2089	20.2039 (88)
util rest of house	0.9564	0.9316	0.8839	0.7656	0.5927	0.4037	0.2760	0.3163	0.5428	0.8103	0.9258	0.9613 (89)
MIT 2	18.7856	19.0572	19.4297	19.8810	20.1208	20.2110	20.2228	20.2233	20.1736	19.8615	19.2931	18.7629 (90)
Living area fraction	19.2202	19.4678	19.8092	20.2264	20.4566	20.5437	20.5571	20.5562	20.5051	20.2035	19.6788	19.1968 (92)
MIT	19.2202	19.4678	19.8092	20.2264	20.4566	20.5437	20.5571	20.5562	20.5051	20.2035	19.6788	19.1968 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2202	19.4678	19.8092	20.2264	20.4566	20.5437	20.5571	20.5562	20.5051	20.2035	19.6788	19.1968 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9471	0.9214	0.8752	0.7662	0.6063	0.4254	0.3010	0.3429	0.5643	0.8099	0.9166	0.9525 (94)
Useful gains	546.8594	593.8585	612.5184	601.0073	513.5607	360.4372	242.8661	253.6506	378.3588	484.5393	516.1522	530.2524 (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	960.4395	934.2780	850.4482	711.3089	548.1215	366.3646	243.9119	255.4468	397.1615	601.1376	792.6051	951.4845 (97)
Space heating kWh	307.7036	228.7619	177.0198	79.4172	25.7132	0.0000	0.0000	0.0000	0.0000	86.7491	199.0460	313.3967 (98a)
Space heating requirement - total per year (kWh/year)												1417.8076
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	307.7036	228.7619	177.0198	79.4172	25.7132	0.0000	0.0000	0.0000	0.0000	86.7491	199.0460	313.3967 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1417.8076
Space heating per m2										(98c) / (4) =		19.1596 (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	307.7036	228.7619	177.0198	79.4172	25.7132	0.0000	0.0000	0.0000	0.0000	86.7491	199.0460	313.3967 (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)	333.3734	247.8460	191.7874	86.0425	27.8583	0.0000	0.0000	0.0000	0.0000	93.9860	215.6512	339.5414 (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	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611 (64)
Efficiency of water heater (217)m	84.7863	84.3981	83.6871	82.3090	80.8271	79.8000	79.8000	79.8000	79.8000	82.4479	84.0702	79.8000 (216)
Fuel for water heating, kWh/month	262.5176	233.1903	250.0336	224.3242	221.9190	203.0972	200.9969	208.7670	210.7910	226.8226	235.6605	259.5880 (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	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	22.1581	17.7760	16.0053	11.7262	9.0577	7.4002	8.2627	10.7402	13.9504	18.3037	20.6740	22.7739 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-34.6470	-48.8615	-70.2632	-79.0451	-85.2832	-79.6290	-78.6490	-74.2251	-66.4236	-55.8927	-38.0974	-29.9529 (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)	-19.5283	-41.0871	-81.6732	-122.6800	-162.2226	-162.9923	-161.0698	-136.3708	-99.9500	-58.7583	-26.0738	-15.4417 (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												1536.0862 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2737.7078 (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)												178.8284 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1828.8177 (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												2709.8047 (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	1536.0862	0.2100	322.5781 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2737.7078	0.2100	574.9186 (264)
Space and water heating			897.4967 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	178.8284	0.1443	25.8105 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-740.9697	0.1346	-99.7152
PV Unit electricity exported	-1087.8480	0.1259	-136.9534
Total			-236.6686 (269)
Total CO2, kg/year			698.5678 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.4400 (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	1536.0862	1.1300	1735.7774 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2737.7078	1.1300	3093.6098 (278)
Space and water heating			4829.3872 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	178.8284	1.5338	274.2930 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-740.9697	1.4974	-1109.4998
PV Unit electricity exported	-1087.8480	0.4621	-502.7132
Total			-1612.2130 (283)
Total Primary energy kWh/year			3621.5680 (286)
Target Primary Energy Rate (TPER)			48.9400 (287)

Energy Report



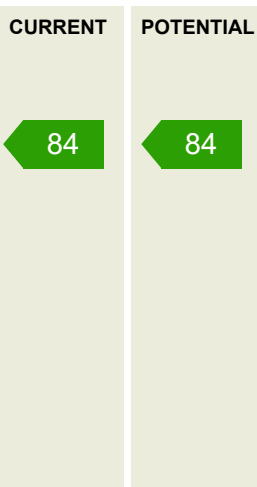
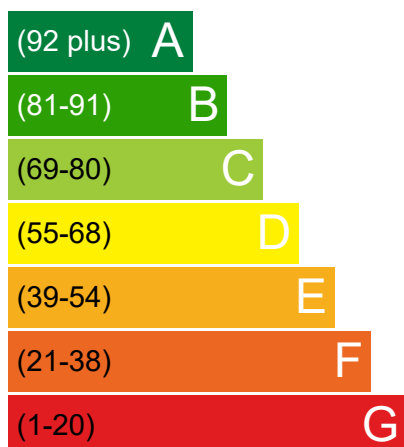
Dwelling Address	
Reference	Block D Flat 7-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	74

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

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

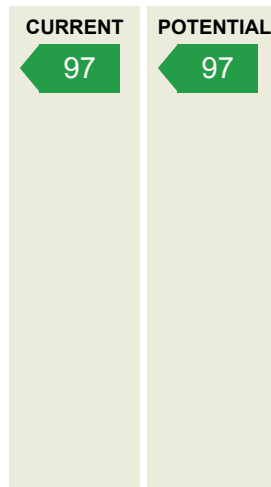
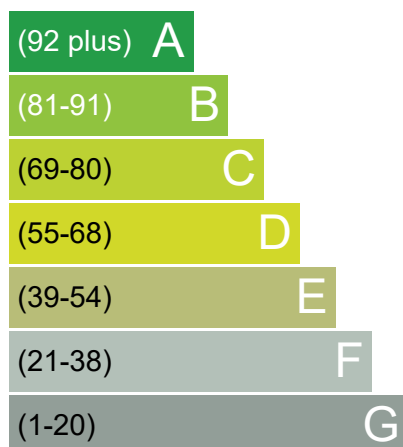
Energy Efficiency Rating

Most energy efficient - lower running costs

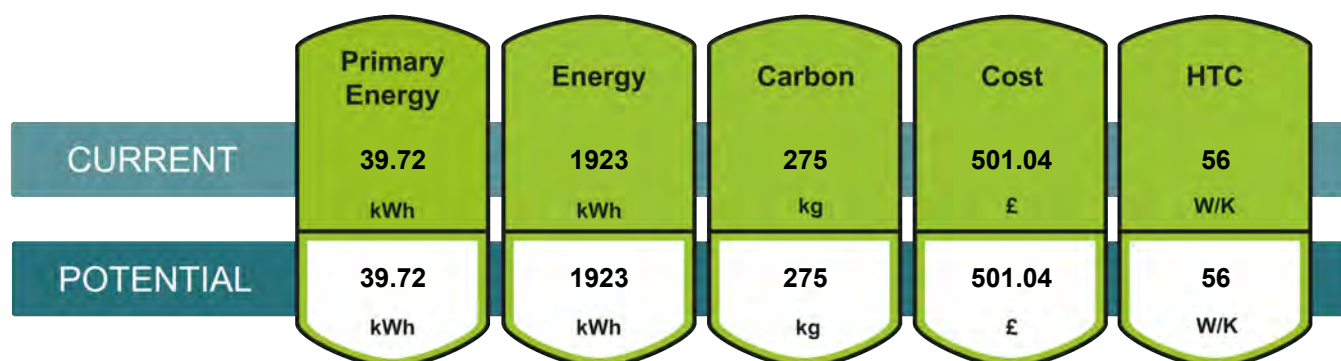


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£54	£54	
Heating		£74	£74	
Hot Water		£374	£374	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£501	£501	

Estimated energy use and potential savings



Space Heating

282

kWh per year



Water Heating

856

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

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Property Reference	Block D Flat 8				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	84 B	DER	3.63	TER	8.43	
Environmental	97 A	% DER < TER				56.94
CO ₂ Emissions (t/year)	0.31	DFEE	24.07	TFEE	26.19	
Compliance Check	See BREL	% DFEE < TFEE				8.10
% DPER < TPER	11.49	DPER	38.58	TPER	43.59	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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	93.0000 (1b)	2.6000 (2b)	241.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		241.8000 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 241.8000 (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)

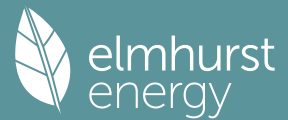
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.2167	0.2125	0.2083	0.1870	0.1827	0.1615	0.1615	0.1573	0.1700	0.1827	0.1913	0.1998 (22b)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860	190.0000	(29a)
Total net area of external elements Aum(A, m ²)			85.8000				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 30.4534		(33)
Main dwelling							
Party Floor 1			93.0000			30.0000	2790.0000 (32d)
Party Ceiling 1			93.0000			20.0000	1860.0000 (32b)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 18462.9994 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							198.5269 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E5 Ground floor (normal)					28.0000	0.0000	0.0000
E16 Corner (normal)					10.4000	0.0000	0.0000
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)
Point Thermal bridges							(36a) = 0.0000
Total fabric heat loss							(33) + (36) + (36a) = 30.4534 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	41.7714	41.6986	41.6273	41.2922	41.2295	40.9376	40.9376	40.8836	41.0500	41.2295	41.3563	41.4889 (38)
Heat transfer coeff	72.2248	72.1520	72.0807	71.7456	71.6829	71.3910	71.3910	71.3370	71.5034	71.6829	71.8097	71.9423 (39)
Average = Sum(39)m / 12 =												71.7453
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.7766	0.7758	0.7751	0.7715	0.7708	0.7676	0.7676	0.7671	0.7689	0.7708	0.7721	0.7736 (40)
HLP (average)												0.7715
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6646 (42)
Hot water usage for mixer showers												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths												
29.0877	28.6486	28.0239	27.0884	26.2454	25.0848	24.2043	25.2810	25.8461	26.9960	28.1916	29.0646	(42b)
Hot water usage for other uses												
41.9181	40.3938	38.8695	37.3453	35.8210	34.2967	34.2967	35.8210	37.3453	38.8695	40.3938	41.9181	(42c)
Average daily hot water use (litres/day)												65.0786 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	71.0058	69.0424	66.8935	64.4337	62.0663	59.3815	58.5010	61.1019	63.1913	65.8656	68.5854	70.9827 (44)
Energy conte	104.5328	91.3571	95.5894	84.1665	79.9787	68.6727	64.6453	71.9181	73.2988	84.8744	92.6955	104.2433 (45)
Energy content (annual)												Total = Sum(45)m = 1015.9726
Distribution loss (46)m = 0.15 x (45)m												
15.6799	13.7036	14.3384	12.6250	11.9968	10.3009	9.6968	10.7877	10.9948	12.7312	13.9043	15.6365	(46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss												
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(56)
If cylinder contains dedicated solar storage												
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(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	(61)
Total heat required for water heating calculated for each month												
158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h												
158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421	(64)
Total per year (kWh/year)												1656.4746 (64)
Electric shower(s)												1656 (64)
55.1745	49.1609	53.6818	51.2279	52.1892	49.7834	51.4428	52.1892	51.2279	53.6818	52.6724	55.1745	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												627.6062 (64a)
Heat gains from water heating, kWh/month												
92.0698	81.9740	88.7230	82.9075	83.1593	77.3947	77.8743	80.4791	79.2940	85.1602	86.1046	91.9736	(65)

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

Metabolic gains (Table 5), Watts												
(66)m	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
132.1206	146.2764	132.1206	136.5246	132.1206	136.5246	132.1206	132.1206	136.5246	132.1206	136.5246	132.1206	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
244.4900	247.0270	240.6338	227.0233	209.8424	193.6949	182.9074	180.3703	186.7636	200.3741	217.5549	233.7024	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	(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	(70)
Losses e.g. evaporation (negative values) (Table 5)												
-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	(71)
Water heating gains (Table 5)												
123.7497	121.9851	119.2513	115.1494	111.7732	107.4927	104.6698	108.1708	110.1306	114.4627	119.5897	123.6204	(72)
Total internal gains												
563.3293	578.2574	554.9746	541.6662	516.7052	500.6811	482.6667	483.6307	496.3877	509.9263	536.6381	552.4124	(73)

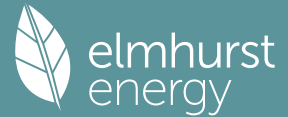
6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				6.2000	11.2829		0.3500		0.0000		0.7700		18.8527 (75)
Southeast				2.1000	36.7938		0.3500		0.0000		0.7700		20.8235 (77)
Northwest				4.8000	11.2829		0.3500		0.0000		0.7700		14.5956 (81)
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	617.6010	681.8124	726.1737	803.2544	854.8545	856.2445	817.2032	758.0131	698.4094	632.3335	603.6664	597.5485	(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 from living area, nil,m (see Table 9a)												
tau	71.0090	71.0806	71.1510	71.4833	71.5458	71.8383	71.8383	71.8927	71.7254	71.5458	71.4195	71.2878
alpha	5.7339	5.7387	5.7434	5.7656	5.7697	5.7892	5.7892	5.7928	5.7817	5.7697	5.7613	5.7525
util living area												
0.9894	0.9800	0.9588	0.8832	0.7296	0.5270	0.3834	0.4310	0.6757	0.9126	0.9774	0.9911	(86)

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Living	20.1082	20.2605	20.4769	20.7619	20.9356	20.9914	20.9989	20.9978	20.9678	20.7473	20.3878	20.0757
Non living	19.2273	19.4201	19.6911	20.0349	20.2231	20.2760	20.2810	20.2810	20.2572	20.0249	19.5849	19.1880
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	20.5438	20.2605	20.4769	20.7619	20.9356	20.9914	20.9989	20.9978	20.9678	20.7473	20.3878	20.0757 (87)
Th 2	20.2736	20.2743	20.2750	20.2781	20.2787	20.2815	20.2815	20.2820	20.2804	20.2787	20.2775	20.2763 (88)
util rest of house												
MIT 2	0.9869	0.9755	0.9493	0.8590	0.6855	0.4704	0.3213	0.3647	0.6155	0.8888	0.9715	0.9890 (89)
Living area fraction	19.8565	19.4201	19.6911	20.0349	20.2231	20.2760	20.2810	20.2810	20.2572	20.0249	19.5849	19.3841 (90)
MIT	19.9747	19.5647	19.8263	20.1600	20.3456	20.3991	20.4045	20.4043	20.3794	20.1492	19.7230	19.5254 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9747	19.5647	19.8263	20.1600	20.3456	20.3991	20.4045	20.4043	20.3794	20.1492	19.7230	19.5254 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9857	0.9699	0.9423	0.8546	0.6898	0.4798	0.3320	0.3760	0.6241	0.8839	0.9657	0.9863 (94)
Useful gains	608.7588	661.2792	684.2832	686.4723	589.6892	410.7946	271.2975	285.0298	435.8791	558.8920	582.9572	589.3456 (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	1132.1054	1058.0845	960.5694	807.8530	619.7449	414.0020	271.6060	285.6547	449.0021	684.5152	906.4575	1102.5425 (97)
Space heating kWh	389.3699	266.6532	205.5569	87.3941	22.3615	0.0000	0.0000	0.0000	0.0000	93.4637	232.9202	381.8185 (98a)
Space heating requirement - total per year (kWh/year)												1679.5380
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	389.3699	266.6532	205.5569	87.3941	22.3615	0.0000	0.0000	0.0000	0.0000	93.4637	232.9202	381.8185 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1679.5380
Space heating per m2										(98c) / (4) =		18.0595 (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 %)												305.9030 (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	389.3699	266.6532	205.5569	87.3941	22.3615	0.0000	0.0000	0.0000	0.0000	93.4637	232.9202	381.8185 (98)
Space heating efficiency (main heating system 1)	305.9030	305.9030	305.9030	305.9030	305.9030	0.0000	0.0000	0.0000	0.0000	305.9030	305.9030	305.9030 (210)
Space heating fuel (main heating system)	127.2854	87.1692	67.1968	28.5692	7.3100	0.0000	0.0000	0.0000	0.0000	30.5534	76.1419	124.8169 (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	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (64)
Efficiency of water heater (217)m	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276	184.5276 (216)
Fuel for water heating, kWh/month	86.1289	76.1357	81.2822	74.1409	72.8225	65.7445	64.5129	68.4542	68.2514	75.4755	78.7630	85.9720 (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	32.8170	26.3270	23.7045	17.3670	13.4147	10.9600	12.2374	15.9066	20.6611	27.1085	30.6190	33.7291 (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												549.0428 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												184.5276
Water heating fuel used												897.6838 (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)												264.8519 (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												2339.1846 (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	549.0428	0.1567	86.0239 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	897.6838	0.1405	126.0868 (264)
Energy for instantaneous electric shower(s)	627.6062	0.1391	87.3139 (264a)
Space and water heating			212.1106 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	264.8519	0.1443	38.2263 (268)
Total CO2, kg/year			337.6508 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.6300 (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	549.0428	1.5800	867.5048 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	897.6838	1.5193	1363.8861 (278)
Energy for instantaneous electric shower(s)	627.6062	1.5143	950.4055 (278a)
Space and water heating			2231.3909 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	264.8519	1.5338	406.2386 (282)
Total Primary energy kWh/year			3588.0350 (286)
Dwelling Primary energy Rate (DPER)			38.5800 (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	93.0000 (1b)	x 2.6000 (2b)	= 241.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	241.8000 (5)

2. Ventilation rate

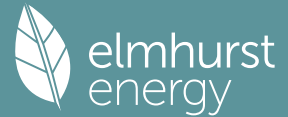
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1241 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3741 (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) = 0.3180 (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	0.4054	0.3974	0.3895	0.3498	0.3418	0.3021	0.3021	0.2941	0.3180	0.3418	0.3577	0.3736 (22b)
Effective ac	0.5822	0.5790	0.5759	0.5612	0.5584	0.5456	0.5456	0.5433	0.5505	0.5584	0.5640	0.5698 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860		(29a)
Total net area of external elements Aum(A, m2)			85.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		28.0860		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							208.5269 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	
E16 Corner (normal)				10.4000	0.0900	0.9360	

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

Point Thermal bridges (33) + (36) + (36a) = 5.4160 (36)
Total fabric heat loss 0.0000
(33) + (36) + (36a) = 33.5020 (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	46.4540	46.1994	45.9498	44.7775	44.5582	43.5372	43.5372	43.3482	43.9305	44.5582	45.0019	45.4658 (38)
Heat transfer coeff	79.9560	79.7014	79.4518	78.2795	78.0602	77.0392	77.0392	76.8502	77.4325	78.0602	78.5039	78.9678 (39)
Average = Sum(39)m / 12 =												78.2785

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.8597	0.8570	0.8543	0.8417	0.8394	0.8284	0.8284	0.8263	0.8326	0.8394	0.8441	0.8491 (40)
HLP (average)												0.8417
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6646 (42)

Hot water usage for mixer showers 68.8963 67.8609 66.3522 63.4655 61.3351 58.9594 57.6091 59.1064 60.7477 63.2985 66.2473 68.6323 (42a)

Hot water usage for baths 29.7509 29.3090 28.6868 27.5396 26.6806 25.7280 25.2135 25.8314 26.5041 27.5233 28.6942 29.6503 (42b)

Hot water usage for other uses 41.9181 40.3938 38.8695 37.3453 35.8210 34.2967 34.2967 35.8210 37.3453 38.8695 40.3938 41.9181 (42c)

Average daily hot water use (litres/day) 129.2112 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	140.5653	137.5638	133.9086	128.3503	123.8366	118.9841	117.1192	120.7587	124.5971	129.6914	135.3353	140.2008 (44)
Energy conte	222.6211	195.8890	205.8125	175.7052	166.7079	146.3048	141.6456	149.5245	153.6407	175.9900	192.8100	219.5205 (45)
Energy content (annual)												Total = Sum(45)m = 2146.1718
Distribution loss (46)m = 0.15 x (45)m	33.3932	29.3834	30.8719	26.3558	25.0062	21.9457	21.2468	22.4287	23.0461	26.3985	28.9215	32.9281 (46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.3938 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.7527 (55)
Total storage loss	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (56)
If cylinder contains dedicated solar storage	23.3325	21.0745	23.3325	22.5798	23.3325	22.5798	23.3325	23.3325	22.5798	23.3325	22.5798	23.3325 (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	269.2160	237.9747	252.4074	220.7970	213.3028	191.3967	188.2405	196.1194	198.7325	222.5849	237.9018	266.1154 (62)
WWHRS	-31.4965	-27.8558	-29.1690	-24.1531	-22.5098	-19.2618	-18.0548	-19.1995	-19.9290	-23.4941	-26.6159	-30.9132 (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	237.7195	210.1190	223.2384	196.6439	190.7931	172.1349	170.1856	176.9199	178.8035	199.0909	211.2859	235.2022 (64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m = 2402.1368 (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	111.2974	98.8017	105.7086	94.4954	92.7063	84.7198	84.3731	86.9928	87.1590	95.7926	100.1828	110.2665 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	132.1206	146.2764	132.1206	136.5246	132.1206	136.5246	132.1206	132.1206	136.5246	132.1206	136.5246	132.1206 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	244.4900	247.0270	240.6338	227.0233	209.8424	193.6949	182.9074	180.3703	186.7636	200.3741	217.5549	233.7024 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230 (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)	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839 (71)
Water heating gains (Table 5)	149.5933	147.0263	142.0814	131.2437	124.6053	117.6664	113.4047	116.9258	121.0542	128.7535	139.1428	148.2077 (72)
Total internal gains	592.1729	606.2986	580.8047	560.7605	532.5373	510.8549	491.4016	492.3857	507.3113	527.2171	559.1912	579.9996 (73)

6. Solar gains

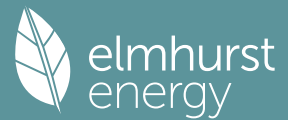
[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d	Gains W				
Northeast	6.2000	11.2829	0.6300	0.7000	0.7700	21.3789 (75)						
Southeast	2.1000	36.7938	0.6300	0.7000	0.7700	23.6138 (77)						
Northwest	4.8000	11.2829	0.6300	0.7000	0.7700	16.5514 (81)						
Solar gains	61.5442	117.4314	194.1398	296.6411	383.4613	403.2089	379.3644	311.1496	229.0926	138.8097	76.0101	51.1843 (83)
Total gains	653.7170	723.7300	774.9445	857.4016	915.9986	914.0638	870.7660	803.5353	736.4039	666.0269	635.2013	631.1840 (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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	67.3739	67.5891	67.8014	68.8168	69.0101	69.9247	69.9247	70.0967	69.5695	69.0101	68.6201	68.2170
alpha	5.4916	5.5059	5.5201	5.5878	5.6007	5.6616	5.6616	5.6731	5.6380	5.6007	5.5747	5.5478
util living area	0.9898	0.9809	0.9603	0.8871	0.7355	0.5317	0.3881	0.4376	0.6885	0.9187	0.9789	0.9914 (86)
MIT	20.0278	20.1897	20.4232	20.7353	20.9259	20.9900	20.9986	20.9973	20.9613	20.7163	20.3346	20.0076 (87)
Th 2	20.2019	20.2042	20.2065	20.2173	20.2194	20.2288	20.2288	20.2306	20.2252	20.2194	20.2153	20.2110 (88)
util rest of house	0.9872	0.9762	0.9505	0.8617	0.6884	0.4707	0.3207	0.3656	0.6238	0.8944	0.9729	0.9893 (89)
MIT 2	19.0670	19.2733	19.5670	19.9497	20.1566	20.2227	20.2282	20.2294	20.1979	19.9368	19.4666	19.0483 (90)
Living area fraction	19.2323	19.4310	19.7143	20.0848	20.2889	20.3547	20.3608	20.3615	20.3293	20.0709	19.6159	19.2133 (91)
MIT	19.2323	19.4310	19.7143	20.0848	20.2889	20.3547	20.3608	20.3615	20.3293	20.0709	19.6159	19.2133 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2323	19.4310	19.7143	20.0848	20.2889	20.3547	20.3608	20.3615	20.3293	20.0709	19.6159	19.2133 (93)

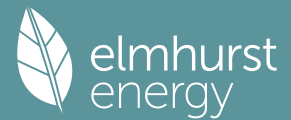
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9831	0.9704	0.9432	0.8569	0.6928	0.4808	0.3323	0.3779	0.6329	0.8891	0.9671	0.9856 (94)
Useful gains	642.6704	702.3322	730.8941	734.7417	634.5780	439.5087	289.3467	303.6745	466.0473	592.1331	614.2774	622.1000 (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	1193.9287	1158.1399	1049.8972	875.5435	670.4528	443.3361	289.7276	304.4439	482.3464	739.3008	982.5491	1185.5664 (97)
Space heating kWh	410.1361	306.3028	237.3383	101.3773	26.6908	0.0000	0.0000	0.0000	0.0000	109.4928	265.1556	419.2190 (98a)
Space heating requirement - total per year (kWh/year)												1875.7127
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	410.1361	306.3028	237.3383	101.3773	26.6908	0.0000	0.0000	0.0000	0.0000	109.4928	265.1556	419.2190 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1875.7127
Space heating per m2										(98c) / (4) =		20.1690 (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	410.1361	306.3028	237.3383	101.3773	26.6908	0.0000	0.0000	0.0000	0.0000	109.4928	265.1556	419.2190 (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)	444.3512	331.8557	257.1379	109.8346	28.9174	0.0000	0.0000	0.0000	0.0000	118.6270	287.2759	454.1918 (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	237.7195	210.1190	223.2384	196.6439	190.7931	172.1349	170.1856	176.9199	178.8035	199.0909	211.2859	235.2022 (64)
Efficiency of water heater (217)m	85.2712	84.9039	84.1974	82.6495	80.8051	79.8000	79.8000	79.8000	79.8000	82.7768	84.5702	79.8000 (216)
Fuel for water heating, kWh/month	278.7806	247.4785	265.1370	237.9253	236.1152	215.7079	213.2652	221.7041	224.0646	240.5153	249.8348	275.6036 (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	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	27.4520	22.0231	19.8293	14.5278	11.2217	9.1682	10.2368	13.3062	17.2834	22.6768	25.6134	28.2150 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-42.8679	-60.1031	-85.9077	-96.0115	-103.0178	-95.9434	-94.7345	-89.6785	-80.6867	-68.4414	-47.0020	-37.0990 (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	-25.2173	-52.9405	-105.0395	-157.5079	-208.0367	-208.9726	-206.5338	-174.9893	-128.4045	-75.6471	-33.6456	-19.9509 (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												2032.1914 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2906.1320 (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)												221.5538 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-2298.3790 (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												2947.4982 (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	2032.1914	0.2100	426.7602 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2906.1320	0.2100	610.2877 (264)
Space and water heating			1037.0479 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	221.5538	0.1443	31.9771 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	0.1347	-121.4448
PV Unit electricity exported	-1396.8855	0.1259	-175.9251
Total			-297.3699 (269)
Total CO2, kg/year			783.5844 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			8.4300 (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	2032.1914	1.1300	2296.3763 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2906.1320	1.1300	3283.9292 (278)
Space and water heating			5580.3055 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	221.5538	1.5338	339.8266 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	1.4979	-1350.3395
PV Unit electricity exported	-1396.8855	0.4623	-645.7684
Total			-1996.1080 (283)
Total Primary energy kWh/year			4054.1249 (286)
Target Primary Energy Rate (TPER)			43.5900 (287)

Energy Report



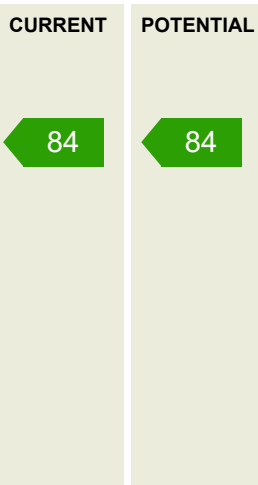
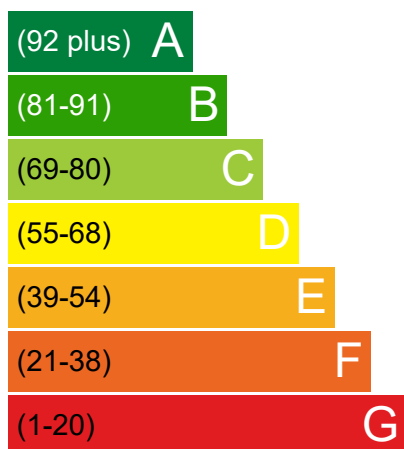
Dwelling Address	
Reference	Block D Flat 8-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	93

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

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

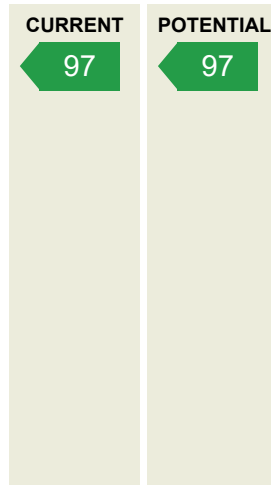
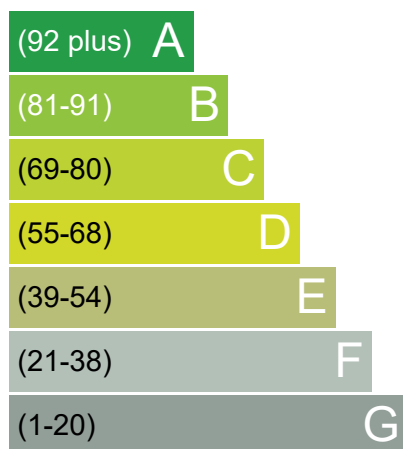
Energy Efficiency Rating

Most energy efficient - lower running costs

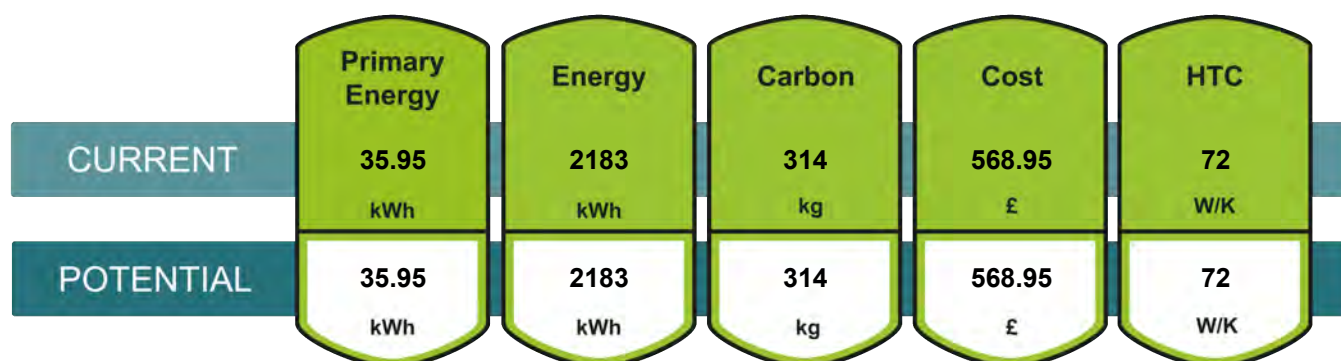


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£69	£69	
Heating		£103	£103	
Hot Water		£397	£397	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£569	£569	

Estimated energy use and potential savings



Space Heating
393
kWh per year



Water Heating
897
kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

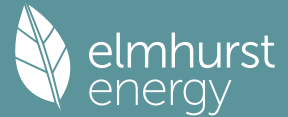
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

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Property Reference	Block D Flat 9				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	83 B	DER	4.01	TER	9.71	
Environmental	96 A	% DER < TER				58.70
CO ₂ Emissions (t/year)	0.35	DFEE	31.16	TFEE	32.10	
Compliance Check	See BREL	% DFEE < TFEE				2.95
% DPER < TPER	16.02	DPER	42.42	TPER	50.52	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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	93.0000 (1b)	2.6000 (2b)	241.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		241.8000 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 241.8000 (5)

2. Ventilation rate

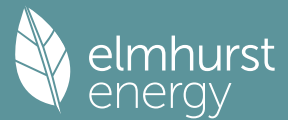
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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												
Opening Type 1			13.1000	1.3258	17.3674			(27)				
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860	190.0000	13812.9994	(29a)				
External Roof 1	93.0000		93.0000	0.1300	12.0900	9.0000	837.0000	(30)				
Total net area of external elements Aum(A, m2)			178.8000					(31)				
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	42.5434			(33)				
Main dwelling												
Party Floor 1			93.0000			30.0000	2790.0000	(32d)				
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	17439.9994	(34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							187.5269	(35)				
List of Thermal Bridges												
K1 Element				Length	Psi-value	Total						
E5 Ground floor (normal)				28.0000	0.0000	0.0000						
E16 Corner (normal)				10.4000	0.0000	0.0000						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000	(36)				
Point Thermal bridges						(36a) =	0.0000					
Total fabric heat loss						(33) + (36) + (36a) =	42.5434	(37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m 41.7714 41.6986 41.6273 41.2922 41.2295 40.9376 40.9376 40.8836 41.0500 41.2295 41.3563 41.4889 (38)
 Heat transfer coeff 84.3148 84.2420 84.1707 83.8356 83.7729 83.4810 83.4810 83.4270 83.5934 83.7729 83.8997 84.0323 (39)
 Average = Sum(39)m / 12 = 83.8353

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9066	0.9058	0.9051	0.9015	0.9008	0.8976	0.8976	0.8971	0.8989	0.9008	0.9021	0.9036	(40)
HLP (average)												0.9015	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6646 (42)
 Hot water usage for mixer showers 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (42a)
 Hot water usage for baths 29.0877 28.6486 28.0239 27.0884 26.2454 25.0848 24.2043 25.2810 25.8461 26.9960 28.1916 29.0646 (42b)
 Hot water usage for other uses 41.9181 40.3938 38.8695 37.3453 35.8210 34.2967 34.2967 35.8210 37.3453 38.8695 40.3938 41.9181 (42c)
 Average daily hot water use (litres/day) 65.0786 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	71.0058	69.0424	66.8935	64.4337	62.0663	59.3815	58.5010	61.1019	63.1913	65.8656	68.5854	70.9827	(44)
Energy conte	104.5328	91.3571	95.5894	84.1665	79.9787	68.6727	64.6453	71.9181	73.2988	84.8744	92.6955	104.2433	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m	15.6799	13.7036	14.3384	12.6250	11.9968	10.3009	9.6968	10.7877	10.9948	12.7312	13.9043	15.6365	(46)
Water storage loss:													
Store volume												150.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												1.0044	(55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(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	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421	(64)
Total per year (kWh/year)												1656.4746	(64)
Electric shower(s)	55.1745	49.1609	53.6818	51.2279	52.1892	49.7834	51.4428	52.1892	51.2279	53.6818	52.6724	55.1745	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												627.6062	(64a)
Heat gains from water heating, kWh/month	92.0698	81.9740	88.7230	82.9075	83.1593	77.3947	77.8743	80.4791	79.2940	85.1602	86.1046	91.9736	(65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	132.1206	146.2764	132.1206	136.5246	132.1206	136.5246	132.1206	132.1206	136.5246	132.1206	136.5246	132.1206	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	244.4900	247.0270	240.6338	227.0233	209.8424	193.6949	182.9074	180.3703	186.7636	200.3741	217.5549	233.7024	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	(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)	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	(71)
Water heating gains (Table 5)	123.7497	121.9851	119.2513	115.1494	111.7732	107.4927	104.6698	108.1708	110.1306	114.4627	119.5897	123.6204	(72)
Total internal gains	563.3293	578.2574	554.9746	541.6662	516.7052	500.6811	482.6667	483.6307	496.3877	509.9263	536.6381	552.4124	(73)

6. Solar gains

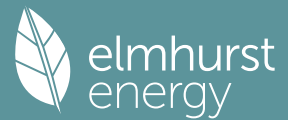
[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W							
Northeast	6.2000	11.2829	0.3500	0.0000	0.7700	18.8527	(75)						
Southeast	2.1000	36.7938	0.3500	0.0000	0.7700	20.8235	(77)						
Northwest	4.8000	11.2829	0.3500	0.0000	0.7700	14.5956	(81)						
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361	(83)
Total gains	617.6010	681.8124	726.1737	803.2544	854.8545	856.2445	817.2032	758.0131	698.4094	632.3335	603.6664	597.5485	(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	57.4566	57.5063	57.5550	57.7851	57.8283	58.0305	58.0305	58.0681	57.9524	57.8283	57.7409	57.6498	
alpha	4.8304	4.8338	4.8370	4.8523	4.8552	4.8687	4.8687	4.8712	4.8635	4.8552	4.8494	4.8433	
util living area	0.9894	0.9818	0.9655	0.9099	0.7886	0.5988	0.4444	0.4970	0.7418	0.9317	0.9798	0.9910	(86)

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Living	19.7883	19.9554	20.2100	20.5684	20.8402	20.9671	20.9937	20.9893	20.9105	20.5705	20.1252	19.7530
Non living	18.7419	18.9542	19.2753	19.7158	20.0234	20.1476	20.1668	20.1650	20.1008	19.7265	19.1734	18.6989
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	20.3801	19.9554	20.2100	20.5684	20.8402	20.9671	20.9937	20.9893	20.9105	20.5705	20.1252	19.9274 (87)
Th 2	20.1619	20.1625	20.1632	20.1663	20.1668	20.1695	20.1695	20.1700	20.1685	20.1668	20.1657	20.1645 (88)
util rest of house												
MIT 2	0.9870	0.9776	0.9572	0.8887	0.7439	0.5300	0.3629	0.4116	0.6768	0.9110	0.9743	0.9889 (89)
Living area fraction	19.5958	18.9542	19.2753	19.7158	20.0234	20.1476	20.1668	20.1650	20.1008	19.7265	19.1734	18.9630 (90)
MIT	19.7307	19.1265	19.4361	19.8625	20.1639	20.2886	20.3090	20.3068	20.2401	19.8717	19.3372	19.1289 (92)
Temperature adjustment												0.0000
adjusted MIT	19.7307	19.1265	19.4361	19.8625	20.1639	20.2886	20.3090	20.3068	20.2401	19.8717	19.3372	19.1289 (93)

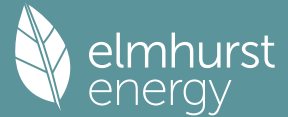
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9854	0.9707	0.9482	0.8798	0.7437	0.5402	0.3768	0.4259	0.6828	0.9022	0.9672	0.9854 (94)
Useful gains	608.6113	661.8304	688.5455	706.6983	635.7461	462.5105	307.9221	322.8689	476.8689	570.4735	583.8455	588.8161 (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	1301.0383	1198.4655	1088.8401	919.0443	709.0493	474.8928	309.6337	325.9348	513.2719	776.7185	1026.6960	1254.5125 (97)
Space heating kWh	515.1657	360.6188	297.8192	152.8892	54.5375	0.0000	0.0000	0.0000	0.0000	153.4463	318.8524	495.2781 (98a)
Space heating requirement - total per year (kWh/year)												2348.6073
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	515.1657	360.6188	297.8192	152.8892	54.5375	0.0000	0.0000	0.0000	0.0000	153.4463	318.8524	495.2781 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2348.6073
Space heating per m2										(98c) / (4) =		25.2538 (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 %)												302.9509 (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	515.1657	360.6188	297.8192	152.8892	54.5375	0.0000	0.0000	0.0000	0.0000	153.4463	318.8524	495.2781 (98)
Space heating efficiency (main heating system 1)	302.9509	302.9509	302.9509	302.9509	302.9509	0.0000	0.0000	0.0000	0.0000	302.9509	302.9509	302.9509 (210)
Space heating fuel (main heating system)	170.0492	119.0354	98.3061	50.4666	18.0021	0.0000	0.0000	0.0000	0.0000	50.6505	105.2489	163.4846 (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	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (64)
Efficiency of water heater (217)m	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000 (216)
Fuel for water heating, kWh/month	86.2821	76.2712	81.4268	74.2728	72.9520	65.8614	64.6276	68.5760	68.3728	75.6098	78.9031	86.1249 (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	32.8170	26.3270	23.7045	17.3670	13.4147	10.9600	12.2374	15.9066	20.6611	27.1085	30.6190	33.7291 (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												775.2435 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												184.2000
Water heating fuel used												899.2805 (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)												264.8519 (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												2566.9820 (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	775.2435	0.1559	120.8266 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	899.2805	0.1405	126.3110 (264)
Energy for instantaneous electric shower(s)	627.6062	0.1391	87.3139 (264a)
Space and water heating			247.1376 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	264.8519	0.1443	38.2263 (268)
Total CO2, kg/year			372.6778 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.0100 (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	775.2435	1.5770	1222.5547 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	899.2805	1.5193	1366.3119 (278)
Energy for instantaneous electric shower(s)	627.6062	1.5143	950.4055 (278a)
Space and water heating			2588.8666 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	264.8519	1.5338	406.2386 (282)
Total Primary energy kWh/year			3945.5107 (286)
Dwelling Primary energy Rate (DPER)			42.4200 (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	93.0000 (1b)	x 2.6000 (2b)	= 241.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	241.8000 (5)

2. Ventilation rate

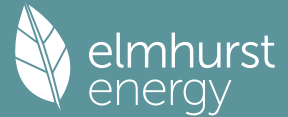
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1241 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3741 (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) = 0.3180 (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	0.4054	0.3974	0.3895	0.3498	0.3418	0.3021	0.3021	0.2941	0.3180	0.3418	0.3577	0.3736 (22b)
Effective ac	0.5822	0.5790	0.5759	0.5612	0.5584	0.5456	0.5456	0.5433	0.5505	0.5584	0.5640	0.5698 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860		(29a)
External Roof 1	93.0000		93.0000	0.1100	10.2300		(30)
Total net area of external elements Aum(A, m2)			178.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		38.3160		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							187.5269 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000 0.0900 0.9360 5.4160 (36)
(33) + (36) + (36a) = 0.0000
43.7320 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 46.4540 46.1994 45.9498 44.7775 44.5582 43.5372 43.5372 43.3482 43.9305 44.5582 45.0019 45.4658 (38)
90.1860 89.9314 89.6818 88.5095 88.2902 87.2692 87.2692 87.0802 87.6625 88.2902 88.7339 89.1978 (39)
Average = Sum(39)m / 12 = 88.5085

HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 0.9697 0.9670 0.9643 0.9517 0.9494 0.9384 0.9384 0.9363 0.9426 0.9494 0.9541 0.9591 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6646 (42)
Hot water usage for mixer showers 68.8963 67.8609 66.3522 63.4655 61.3351 58.9594 57.6091 59.1064 60.7477 63.2985 66.2473 68.6323 (42a)
Hot water usage for baths 29.7509 29.3090 28.6868 27.5396 26.6806 25.7280 25.2135 25.8314 26.5041 27.5233 28.6942 29.6503 (42b)
Hot water usage for other uses 41.9181 40.3938 38.8695 37.3453 35.8210 34.2967 34.2967 35.8210 37.3453 38.8695 40.3938 41.9181 (42c)
Average daily hot water use (litres/day) 129.2112 (43)

Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 140.5653 137.5638 133.9086 128.3503 123.8366 118.9841 117.1192 120.7587 124.5971 129.6914 135.3353 140.2008 (44)
Energy content (annual) 222.6211 195.8890 205.8125 175.7052 166.7079 146.3048 141.6456 149.5245 153.6407 175.9900 192.8100 219.5205 (45)
Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 2146.1718
33.3932 29.3834 30.8719 26.3558 25.0062 21.9457 21.2468 22.4287 23.0461 26.3985 28.9215 32.9281 (46)

Water storage loss:
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):
Temperature factor from Table 2b 1.3938 (48)
Enter (49) or (54) in (55) 0.5400 (49)
Total storage loss 0.7527 (55)
23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (56)

If cylinder contains dedicated solar storage
23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (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
269.2160 237.9747 252.4074 220.7970 213.3028 191.3967 188.2405 196.1194 198.7325 222.5849 237.9018 266.1154 (62)
WWHRS -31.4965 -27.8558 -29.1690 -24.1531 -22.5098 -19.2618 -18.0548 -19.1995 -19.9290 -23.4941 -26.6159 -30.9132 (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 237.7195 210.1190 223.2384 196.6439 190.7931 172.1349 170.1856 176.9199 178.8035 199.0909 211.2859 235.2022 (64)
Total per year (kWh/year) = Sum(64)m = 2402.1368 (64)
2402 (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)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month
111.2974 98.8017 105.7086 94.4954 92.7063 84.7198 84.3731 86.9928 87.1590 95.7926 100.1828 110.2665 (65)

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

Metabolic gains (Table 5), Watts
(66)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 (66)
132.1206 146.2764 132.1206 136.5246 132.1206 136.5246 132.1206 132.1206 136.5246 132.1206 136.5246 132.1206 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 244.4900 247.0270 240.6338 227.0233 209.8424 193.6949 182.9074 180.3703 186.7636 200.3741 217.5549 233.7024 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 (71)
Water heating gains (Table 5) 149.5933 147.0263 142.0814 131.2437 124.6053 117.6664 113.4047 116.9258 121.0542 128.7535 139.1428 148.2077 (72)
Total internal gains 592.1729 606.2986 580.8047 560.7605 532.5373 510.8549 491.4016 492.3857 507.3113 527.2171 559.1912 579.9996 (73)

6. Solar gains

[Jan] Area Solar flux g FF Access Gains
m2 Table 6a W/m2 Specific data Specific data factor W
or Table 6b or Table 6c Table 6d

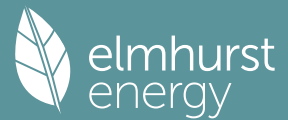
Northeast 6.2000 11.2829 0.6300 0.7000 0.7700 21.3789 (75)
Southeast 2.1000 36.7938 0.6300 0.7000 0.7700 23.6138 (77)
Northwest 4.8000 11.2829 0.6300 0.7000 0.7700 16.5514 (81)

Solar gains 61.5442 117.4314 194.1398 296.6411 383.4613 403.2089 379.3644 311.1496 229.0926 138.8097 76.0101 51.1843 (83)
Total gains 653.7170 723.7300 774.9445 857.4016 915.9986 914.0638 870.7660 803.5353 736.4039 666.0269 635.2013 631.1840 (84)

7. Mean internal temperature (heating season)

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

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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	53.7162	53.8682	54.0182	54.7336	54.8695	55.5115	55.5115	55.6320	55.2624	54.8695	54.5952	54.3113	
alpha	4.5811	4.5912	4.6012	4.6489	4.6580	4.7008	4.7008	4.7088	4.6842	4.6580	4.6397	4.6208	
util living area	0.9875	0.9788	0.9605	0.9009	0.7755	0.5861	0.4357	0.4889	0.7347	0.9265	0.9771	0.9893	(86)
MIT	19.7112	19.8918	20.1661	20.5509	20.8333	20.9656	20.9930	20.9883	20.9038	20.5468	20.0789	19.6875	(87)
Th 2	20.1086	20.1109	20.1132	20.1238	20.1257	20.1350	20.1350	20.1367	20.1314	20.1257	20.1217	20.1175	(88)
util rest of house	0.9846	0.9739	0.9510	0.8777	0.7285	0.5157	0.3525	0.4015	0.6674	0.9042	0.9710	0.9867	(89)
MIT 2	18.6056	18.8358	19.1821	19.6589	19.9778	20.1124	20.1321	20.1314	20.0594	19.6646	19.0826	18.5820	(90)
Living area fraction									FLA = Living area /	(4) =	0.1720	0.1720	(91)
MIT	18.7958	19.0175	19.3514	19.8124	20.1250	20.2592	20.2802	20.2788	20.2046	19.8164	19.2540	18.7722	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7958	19.0175	19.3514	19.8124	20.1250	20.2592	20.2802	20.2788	20.2046	19.8164	19.2540	18.7722	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9787	0.9660	0.9409	0.8682	0.7284	0.5261	0.3667	0.4162	0.6735	0.8947	0.9629	0.9814	(94)
Useful gains	639.7653	699.0984	729.1069	744.4002	667.2456	480.9170	319.2954	334.4364	495.9822	595.8836	611.6163	619.4519	(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	1307.3190	1269.6020	1152.5365	965.8494	743.8419	493.8731	321.1666	337.7672	535.1483	813.7160	1078.4714	1299.8077	(97)
Space heating kWh	496.6599	383.3784	315.0316	159.4434	56.9876	0.0000	0.0000	0.0000	0.0000	162.0673	336.1356	506.1847	(98a)
Space heating requirement - total per year (kWh/year)												2415.8887	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	496.6599	383.3784	315.0316	159.4434	56.9876	0.0000	0.0000	0.0000	0.0000	162.0673	336.1356	506.1847	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2415.8887	
Space heating per m2										(98c) / (4) =		25.9773	(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	496.6599	383.3784	315.0316	159.4434	56.9876	0.0000	0.0000	0.0000	0.0000	162.0673	336.1356	506.1847	(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)	538.0931	415.3612	341.3127	172.7448	61.7417	0.0000	0.0000	0.0000	0.0000	175.5876	364.1773	548.4125	(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	237.7195	210.1190	223.2384	196.6439	190.7931	172.1349	170.1856	176.9199	178.8035	199.0909	211.2859	235.2022	(64)
Efficiency of water heater (217)m	85.6723	85.3905	84.8320	83.5936	81.7045	79.8000	79.8000	79.8000	79.8000	83.6023	85.0958	79.8000	(216)
Fuel for water heating, kWh/month	277.4753	246.0684	263.1534	235.2380	233.5159	215.7079	213.2652	221.7041	224.0646	238.1405	248.2918	274.3442	(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	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	27.4520	22.0231	19.8293	14.5278	11.2217	9.1682	10.2368	13.3062	17.2834	22.6768	25.6134	28.2150	(232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-42.8679	-60.1031	-85.9077	-96.0115	-103.0178	-95.9434	-94.7345	-89.6785	-80.6867	-68.4414	-47.0020	-37.0990	(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	-25.2173	-52.9405	-105.0395	-157.5079	-208.0367	-208.9726	-206.5338	-174.9893	-128.4045	-75.6471	-33.6456	-19.9509	(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												2617.4309	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												79.8000	
Water heating fuel used												2890.9693	(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)												221.5538	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-2298.3790	(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)

Full SAP Calculation Printout



Total delivered energy for all uses

3517.5750 (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	2617.4309	0.2100	549.6605 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2890.9693	0.2100	607.1036 (264)
Space and water heating			1156.7640 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	221.5538	0.1443	31.9771 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	0.1347	-121.4448
PV Unit electricity exported	-1396.8855	0.1259	-175.9251
Total			-297.3699 (269)
Total CO2, kg/year			903.3005 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.7100 (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	2617.4309	1.1300	2957.6969 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2890.9693	1.1300	3266.7954 (278)
Space and water heating			6224.4922 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	221.5538	1.5338	339.8266 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	1.4979	-1350.3395
PV Unit electricity exported	-1396.8855	0.4623	-645.7684
Total			-1996.1080 (283)
Total Primary energy kWh/year			4698.3116 (286)
Target Primary Energy Rate (TPER)			50.5200 (287)

Energy Report

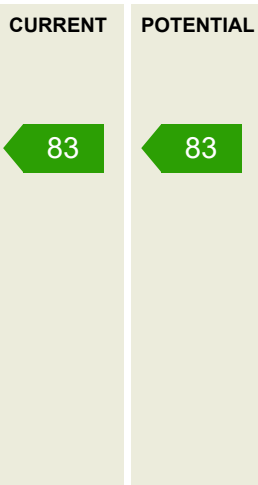
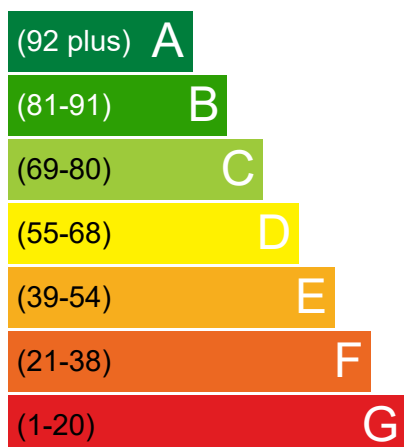
Dwelling Address	
Reference	Block D Flat 9-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	93

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

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

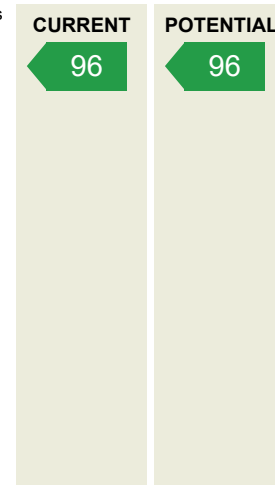
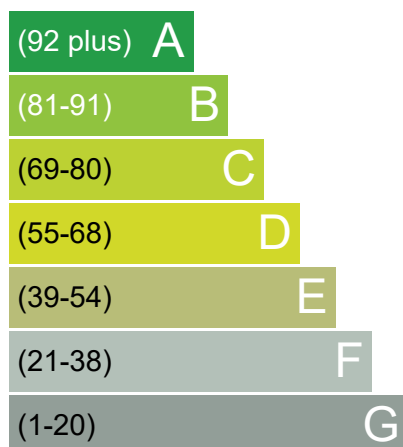
Energy Efficiency Rating

Most energy efficient - lower running costs

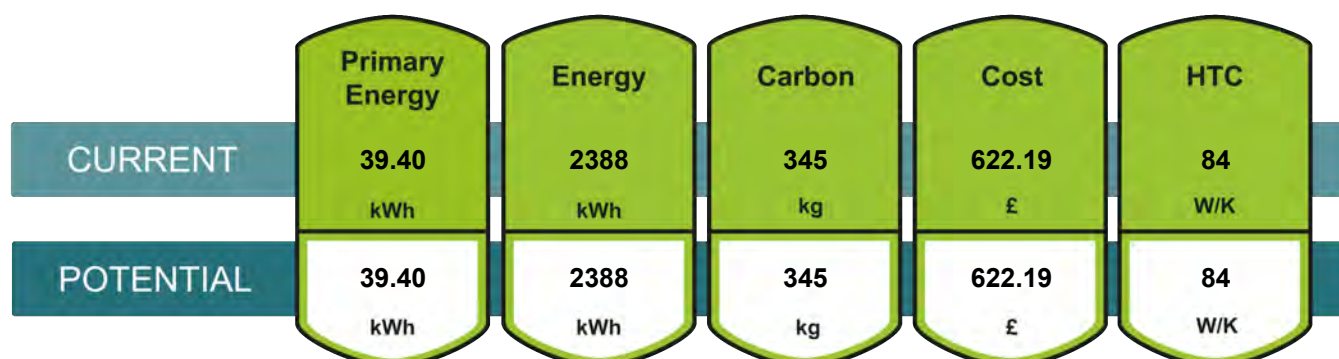


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£69	£69	
Heating		£155	£155	
Hot Water		£398	£398	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£622	£622	

Estimated energy use and potential savings



Space Heating

596

kWh per year



Water Heating

899

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

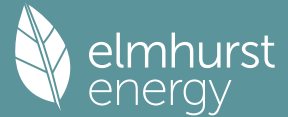
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block D Flat 10				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	83 B	DER	4.20	TER	10.34	
Environmental	97 A	% DER < TER				59.38
CO ₂ Emissions (t/year)	0.29	DFEE	28.19	TFEE	29.65	
Compliance Check	See BREL	% DFEE < TFEE				4.92
% DPER < TPER	16.79	DPER	44.73	TPER	53.76	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		
Dwelling volume			

2. Ventilation rate

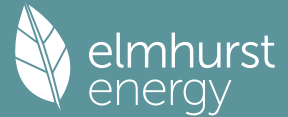
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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	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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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												
Opening Type 1			13.1000	1.3258	17.3674			(27)				
External Wall 1	26.0000	13.1000	12.9000	0.1800	2.3220	190.0000	2450.9998	(29a)				
External Roof 1	74.0000		74.0000	0.1300	9.6200	9.0000	666.0000	(30)				
Total net area of external elements Aum(A, m2)			100.0000					(31)				
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	29.3094			(33)				
Main dwelling												
Party Floor 1			74.0000			30.0000	2220.0000	(32d)				
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		5336.9998	(34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							72.1216	(35)				
List of Thermal Bridges												
K1 Element					Length	Psi-value	Total					
E5 Ground floor (normal)					28.0000	0.0000	0.0000					
E16 Corner (normal)					10.4000	0.0000	0.0000					
Thermal bridges (Sum(L x Psi) calculated using Appendix K)												
Point Thermal bridges						(36a) =	0.0000	(36)				
Total fabric heat loss					(33) + (36) + (36a) =		29.3094	(37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	33.2374	33.1795	33.1228	32.8561	32.8062	32.5740	32.5740	32.5310	32.6635	32.8062	32.9072	33.0127 (38)
Heat transfer coeff	62.5469	62.4890	62.4322	62.1655	62.1157	61.8834	61.8834	61.8404	61.9729	62.1157	62.2166	62.3221 (39)
Average = Sum(39)m / 12 =												62.1653
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.8452	0.8444	0.8437	0.8401	0.8394	0.8363	0.8363	0.8357	0.8375	0.8394	0.8408	0.8422 (40)
HLP (average)												0.8401
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3392 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	26.7937	26.3892	25.8138	24.9521	24.1756	23.1065	22.2955	23.2872	23.8077	24.8670	25.9683	26.7724	(42b)
Hot water usage for other uses	38.5857	37.1826	35.7795	34.3763	32.9732	31.5701	31.5701	32.9732	34.3763	35.7795	37.1826	38.5857	(42c)
Average daily hot water use (litres/day)													59.9220 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	65.3794	63.5718	61.5933	59.3285	57.1488	54.6766	53.8656	56.2605	58.1841	60.6464	63.1509	65.3581	(44)
Energy conte	96.2498	84.1184	88.0155	77.4978	73.6420	63.2317	59.5230	66.2196	67.4906	78.1491	85.3505	95.9832	(45)
Energy content (annual)										Total = Sum(45)m =			935.4712
Distribution loss (46)m = 0.15 x (45)m	14.4375	12.6178	13.2023	11.6247	11.0463	9.4848	8.9285	9.9329	10.1236	11.7224	12.8026	14.3975	(46)
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8600 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(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	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820	(64)
								Total per year (kWh/year) = Sum(64)m =					1575.9732 (64)
12Total per year (kWh/year)													1576 (64)
Electric shower(s)	50.8051	45.2677	49.4306	47.1711	48.0562	45.8410	47.3690	48.0562	47.1711	49.4306	48.5012	50.8051	(64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					577.9048 (64a)
Heat gains from water heating, kWh/month	88.2234	78.5938	85.1419	79.6760	80.0191	74.6000	75.1527	77.5511	76.3486	81.8613	82.6195	88.1347	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.6419	118.0678	106.6419	110.1966	106.6419	110.1966	106.6419	106.6419	110.1966	106.6419	110.1966	106.6419	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	(69)
Pumps, fans	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)	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	(71)
Water heating gains (Table 5)	118.5798	116.9551	114.4380	110.6611	107.5525	103.6111	101.0117	104.2354	106.0397	110.0286	114.7494	118.4607	(72)
Total internal gains	489.7569	501.7004	482.3589	470.6440	449.4732	435.4516	420.1884	421.2698	432.0274	443.9542	466.7372	480.5287	(73)

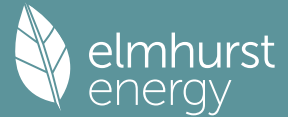
6. Solar gains

[Jan]													
				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W	
Northeast				6.2000	11.2829	0.3500		0.0000		0.7700		18.8527 (75)	
Southeast				2.1000	36.7938	0.3500		0.0000		0.7700		20.8235 (77)	
Northwest				4.8000	11.2829	0.3500		0.0000		0.7700		14.5956 (81)	
Solar gains		54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains		544.0286	605.2554	653.5580	732.2323	787.6225	791.0150	754.7249	695.6522	634.0491	566.3614	533.7655	525.6648 (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	23.7022	23.7242	23.7458	23.8476	23.8668	23.9563	23.9563	23.9730	23.9218	23.8668	23.8281	23.7877	
alpha	2.5801	2.5816	2.5831	2.5898	2.5911	2.5971	2.5971	2.5982	2.5948	2.5911	2.5885	2.5858	
util living area	0.9014	0.8720	0.8260	0.7311	0.6031	0.4555	0.3440	0.3843	0.5701	0.7672	0.8666	0.9084	(86)

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Living	18.8987	19.1855	19.6133	20.1755	20.6095	20.8638	20.9518	20.9347	20.7482	20.1957	19.4714	18.8374
Non living	17.7326	18.0911	18.6238	19.3114	19.8216	20.1030	20.1887	20.1754	19.9880	19.3504	18.4575	17.6575
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	19.9251	19.1855	19.6133	20.1755	20.6095	20.8638	20.9518	20.9347	20.7482	20.1957	19.4714	19.1399 (87)
Th 2	20.2143	20.2150	20.2156	20.2187	20.2193	20.2220	20.2220	20.2225	20.2210	20.2193	20.2181	20.2169 (88)
util rest of house												
MIT 2	0.8922	0.8603	0.8100	0.7069	0.5684	0.4090	0.2880	0.3259	0.5230	0.7406	0.8526	0.8998 (89)
Living area fraction	19.2250	18.0911	18.6238	19.3114	19.8216	20.1030	20.1887	20.1754	19.9880	19.3504	18.4575	18.1187 (90)
MIT	19.5277	18.5644	19.0517	19.6851	20.1623	20.4320	20.5187	20.5037	20.3167	19.7159	18.8960	18.5603 (92)
Temperature adjustment												0.0000
adjusted MIT	19.5277	18.5644	19.0517	19.6851	20.1623	20.4320	20.5187	20.5037	20.3167	19.7159	18.8960	18.5603 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.8832	0.8310	0.7828	0.6890	0.5657	0.4219	0.3097	0.3475	0.5291	0.7215	0.8244	0.8776 (94)
Useful gains	480.4721	502.9416	511.5886	504.4770	445.5915	333.7177	233.7283	241.7193	335.4588	408.6065	440.0292	461.3300 (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	952.4450	853.8721	783.6284	670.4603	525.6422	360.9028	242.5026	253.7747	385.2678	566.2418	733.9042	894.9638 (97)
Space heating kWh	351.1478	235.8253	202.3976	119.5080	59.5577	0.0000	0.0000	0.0000	0.0000	117.2807	211.5900	322.6235 (98a)
Space heating requirement - total per year (kWh/year)												1619.9307
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	351.1478	235.8253	202.3976	119.5080	59.5577	0.0000	0.0000	0.0000	0.0000	117.2807	211.5900	322.6235 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1619.9307
Space heating per m2										(98c) / (4) =		21.8910 (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 %)												306.3574 (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	351.1478	235.8253	202.3976	119.5080	59.5577	0.0000	0.0000	0.0000	0.0000	117.2807	211.5900	322.6235 (98)
Space heating efficiency (main heating system 1)	306.3574	306.3574	306.3574	306.3574	306.3574	0.0000	0.0000	0.0000	0.0000	306.3574	306.3574	306.3574 (210)
Space heating fuel (main heating system)	114.6203	76.9772	66.0658	39.0093	19.4406	0.0000	0.0000	0.0000	0.0000	38.2823	69.0664	105.3095 (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	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820 (64)
Efficiency of water heater (217)m	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602 (216)
Fuel for water heating, kWh/month	80.9676	71.6181	76.5421	69.9461	68.8169	62.2786	61.2285	64.8276	64.5676	71.2393	74.1666	80.8244 (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	25.5207	20.4737	18.4343	13.5057	10.4322	8.5232	9.5166	12.3701	16.0675	21.0814	23.8114	26.2300 (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												528.7715 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												186.0602
Water heating fuel used												847.0234 (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)												205.9667 (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												2159.6665 (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	528.7715	0.1552	82.0529 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	847.0234	0.1404	118.9235 (264)
Energy for instantaneous electric shower(s)	577.9048	0.1391	80.3993 (264a)
Space and water heating			200.9764 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	205.9667	0.1443	29.7274 (268)
Total CO ₂ , kg/year			311.1031 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.2000 (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	528.7715	1.5745	832.5287 (275)
Total CO ₂ associated with community systems			0.0000 (473)
Water heating (other fuel)	847.0234	1.5191	1286.7373 (278)
Energy for instantaneous electric shower(s)	577.9048	1.5143	875.1410 (278a)
Space and water heating			2119.2659 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	205.9667	1.5338	315.9186 (282)
Total Primary energy kWh/year			3310.3256 (286)
Dwelling Primary energy Rate (DPER)			44.7300 (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	74.0000 (1b)	x 2.6000 (2b)	= 192.4000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	192.4000 (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	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

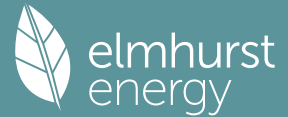
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1559 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.4059	(18)
Number of sides sheltered	2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3450 (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	0.4399	0.4313	0.4227	0.3795	0.3709	0.3278	0.3278	0.3192	0.3450	0.3709	0.3882	0.4054 (22b)
Effective ac	0.5968	0.5930	0.5893	0.5720	0.5688	0.5537	0.5537	0.5509	0.5595	0.5688	0.5753	0.5822 (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							
TER Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	26.0000	13.1000	12.9000	0.1800	2.3220		(29a)
External Roof 1	74.0000		74.0000	0.1100	8.1400		(30)
Total net area of external elements Aum(A, m ²)			100.0000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	25.4620		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							72.1216 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal) 10.4000 0.0900 0.9360
 Thermal bridges (Sum(L x Psi) calculated using Appendix K) 5.4160 (36)
 Point Thermal bridges (36a) = 0.0000
 Total fabric heat loss (33) + (36) + (36a) = 30.8780 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
 (38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 Heat transfer coeff 37.8898 37.6513 37.4174 36.3190 36.1135 35.1569 35.1569 34.9797 35.5254 36.1135 36.5293 36.9639 (38)
 Heat transfer coeff 68.7678 68.5293 68.2954 67.1970 66.9915 66.0349 66.0349 65.8577 66.4034 66.9915 67.4073 67.8419 (39)
 Average = Sum(39)m / 12 = 67.1960
 HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 HLP (average) 0.9293 0.9261 0.9229 0.9081 0.9053 0.8924 0.8924 0.8900 0.8973 0.9053 0.9109 0.9168 (40)
 Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.3392 (42)
 Hot water usage for mixer showers 63.4403 62.4869 61.0976 58.4395 56.4779 54.2903 53.0469 54.4256 55.9370 58.2858 61.0010 63.1972 (42a)
 Hot water usage for baths 27.4046 26.9976 26.4245 25.3677 24.5764 23.6990 23.2251 23.7942 24.4139 25.3527 26.4313 27.3120 (42b)
 Hot water usage for other uses 38.5857 37.1826 35.7795 34.3763 32.9732 31.5701 31.5701 32.9732 34.3763 35.7795 37.1826 38.5857 (42c)
 Average daily hot water use (litres/day) 118.9761 (43)
 Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 Energy conte 129.4306 126.6671 123.3016 118.1836 114.0275 109.5594 107.8421 111.1931 114.7272 119.4180 124.6149 129.0949 (44)
 Energy content (annual) 204.9864 180.3722 189.5099 161.7874 153.5030 134.7161 130.4256 137.6802 141.4701 162.0491 177.5367 202.1314 (45)
 Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 1976.1681
 30.7480 27.0558 28.4265 24.2681 23.0254 20.2074 19.5638 20.6520 21.2205 24.3074 26.6305 30.3197 (46)
 Water storage loss:
 Store volume 150.0000 (47)
 a) If manufacturer declared loss factor is known (kWh/day): 1.3938 (48)
 Temperature factor from Table 2b 0.5400 (49)
 Enter (49) or (54) in (55) 0.7527 (55)
 Total storage loss
 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (56)
 If cylinder contains dedicated solar storage
 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (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
 251.5813 222.4579 236.1048 206.8792 200.0979 179.8079 177.0205 184.2751 186.5620 208.6440 222.6285 248.7263 (62)
 WWHRs -29.0022 -25.6498 -26.8590 -22.2403 -20.7272 -17.7364 -16.6250 -17.6791 -18.3508 -21.6335 -24.5082 -28.4652 (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 222.5790 196.8081 209.2458 184.6389 179.3707 162.0715 160.3955 166.5961 168.2112 187.0105 198.1204 220.2611 (64)
 Total per year (kWh/year) = Sum(64)m = 2255.3088 (64)
 2255 (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)
 Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)
 Heat gains from water heating, kWh/month 105.4339 93.6423 100.2880 89.8678 88.3157 80.8666 80.6424 83.0546 83.1123 91.1572 95.1044 104.4846 (65)

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

Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 (66)m 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 (66)
 Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 106.6419 118.0678 106.6419 110.1966 106.6419 110.1966 106.6419 106.6419 110.1966 106.6419 110.1966 106.6419 (67)
 Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 206.4473 208.5895 203.1911 191.6984 177.1909 163.5559 154.4469 152.3047 157.7031 169.1958 183.7033 197.3383 (68)
 Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 (69)
 Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 (70)
 Losses e.g. evaporation (negative values) (Table 5) -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 (71)
 Water heating gains (Table 5) 141.7122 139.3487 134.7956 124.8164 118.7038 112.3147 108.3904 111.6325 115.4337 122.5232 132.0895 140.4363 (72)
 Total internal gains 515.8893 527.0940 505.7165 487.7993 463.6246 444.1552 427.5671 428.6670 441.4214 459.4488 487.0773 505.5044 (73)

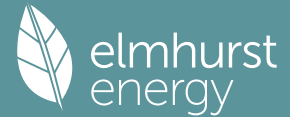
6. Solar gains

[Jan] Area m2 Solar flux Table 6a W/m2 g Specific data or Table 6b FF Specific data or Table 6c Access factor Table 6d Gains W
 Northeast 6.2000 11.2829 0.6300 0.7000 0.7700 21.3789 (75)
 Southeast 2.1000 36.7938 0.6300 0.7000 0.7700 23.6138 (77)
 Northwest 4.8000 11.2829 0.6300 0.7000 0.7700 16.5514 (81)
 Solar gains 61.5442 117.4314 194.1398 296.6411 383.4613 403.2089 379.3644 311.1496 229.0926 138.8097 76.0101 51.1843 (83)
 Total gains 577.4335 644.5254 699.8563 784.4404 847.0859 847.3641 806.9315 739.8166 670.5140 598.2586 563.0874 556.6887 (84)

7. Mean internal temperature (heating season)

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

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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	21.5580	21.6331	21.7072	22.0620	22.1297	22.4503	22.4503	22.5106	22.3257	22.1297	21.9932	21.8523
alpha	2.4372	2.4422	2.4471	2.4708	2.4753	2.4967	2.4967	2.5007	2.4884	2.4753	2.4662	2.4568
util living area	0.8973	0.8673	0.8203	0.7245	0.5969	0.4505	0.3416	0.3824	0.5692	0.7642	0.8629	0.9040 (86)
MIT	18.7019	19.0124	19.4780	20.0990	20.5672	20.8483	20.9446	20.9255	20.7168	20.1171	19.3414	18.6659 (87)
Th 2	20.1427	20.1454	20.1481	20.1606	20.1630	20.1740	20.1740	20.1760	20.1698	20.1630	20.1582	20.1533 (88)
util rest of house	0.8873	0.8547	0.8031	0.6989	0.5604	0.4020	0.2827	0.3212	0.5198	0.7362	0.8480	0.8946 (89)
MIT 2	17.4426	17.8314	18.4118	19.1761	19.7266	20.0434	20.1366	20.1234	19.9108	19.2159	18.2580	17.4039 (90)
Living area fraction	17.9872	18.3421	18.8729	19.5752	20.0901	20.3915	20.4860	20.4703	20.2593	19.6056	18.7265	17.9496 (91)
MIT	17.9872	18.3421	18.8729	19.5752	20.0901	20.3915	20.4860	20.4703	20.2593	19.6056	18.7265	17.9496 (92)
Temperature adjustment												0.0000
adjusted MIT	17.9872	18.3421	18.8729	19.5752	20.0901	20.3915	20.4860	20.4703	20.2593	19.6056	18.7265	17.9496 (93)

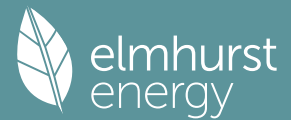
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8556	0.8226	0.7733	0.6794	0.5571	0.4151	0.3054	0.3435	0.5254	0.7152	0.8174	0.8637 (94)
Useful gains	494.0394	530.1582	541.2108	532.9563	471.8706	351.7475	246.4070	254.1618	352.2632	427.8976	460.2527	480.7949 (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	941.2371	921.1757	845.0095	717.3396	562.0677	382.4387	256.6113	268.0574	409.0009	603.3007	783.7100	932.8013 (97)
Space heating kWh	332.7151	262.7638	226.0262	132.7559	67.1067	0.0000	0.0000	0.0000	0.0000	130.4999	232.8893	336.2928 (98a)
Space heating requirement - total per year (kWh/year)												1721.0496
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	332.7151	262.7638	226.0262	132.7559	67.1067	0.0000	0.0000	0.0000	0.0000	130.4999	232.8893	336.2928 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1721.0496
Space heating per m2										(98c) / (4) =		23.2574 (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	332.7151	262.7638	226.0262	132.7559	67.1067	0.0000	0.0000	0.0000	0.0000	130.4999	232.8893	336.2928 (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)	360.4714	284.6845	244.8822	143.8309	72.7050	0.0000	0.0000	0.0000	0.0000	141.3867	252.3177	364.3475 (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	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611 (64)
Efficiency of water heater (217)m	84.9593	84.7087	84.2331	83.3326	82.0645	79.8000	79.8000	79.8000	79.8000	83.2687	84.4233	79.8000 (216)
Fuel for water heating, kWh/month	261.9832	232.3351	248.4127	221.5685	218.5728	203.0972	200.9969	208.7670	210.7910	224.5868	234.6749	259.1130 (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	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	22.1581	17.7760	16.0053	11.7262	9.0577	7.4002	8.2627	10.7402	13.9504	18.3037	20.6740	22.7739 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-34.6470	-48.8615	-70.2632	-79.0451	-85.2832	-79.6290	-78.6490	-74.2251	-66.4236	-55.8927	-38.0974	-29.9529 (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	-19.5283	-41.0871	-81.6732	-122.6800	-162.2226	-162.9923	-161.0698	-136.3708	-99.9500	-58.7583	-26.0738	-15.4417 (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												1864.6258 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2724.8991 (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)												178.8284 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1828.8177 (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)

Full SAP Calculation Printout



Total delivered energy for all uses

3025.5356 (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	1864.6258	0.2100	391.5714 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2724.8991	0.2100	572.2288 (264)
Space and water heating			963.8002 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	178.8284	0.1443	25.8105 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-740.9697	0.1346	-99.7152
PV Unit electricity exported	-1087.8480	0.1259	-136.9534
Total			-236.6686 (269)
Total CO2, kg/year			764.8713 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.3400 (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	1864.6258	1.1300	2107.0271 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2724.8991	1.1300	3079.1360 (278)
Space and water heating			5186.1631 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	178.8284	1.5338	274.2930 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-740.9697	1.4974	-1109.4998
PV Unit electricity exported	-1087.8480	0.4621	-502.7132
Total			-1612.2130 (283)
Total Primary energy kWh/year			3978.3439 (286)
Target Primary Energy Rate (TPER)			53.7600 (287)

Energy Report



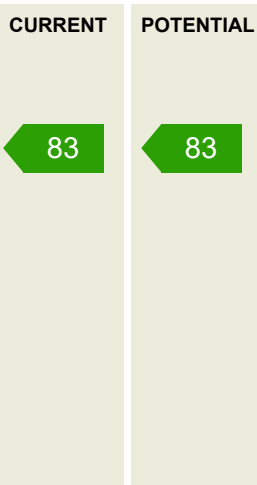
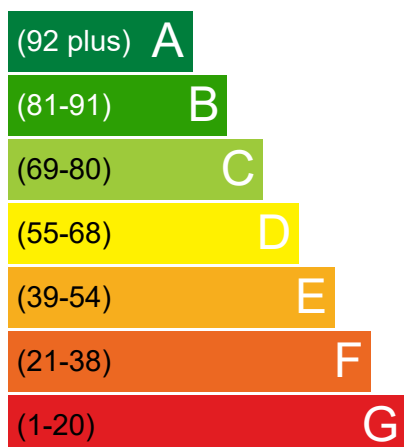
Dwelling Address	
Reference	Block D Flat 10-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	74

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

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

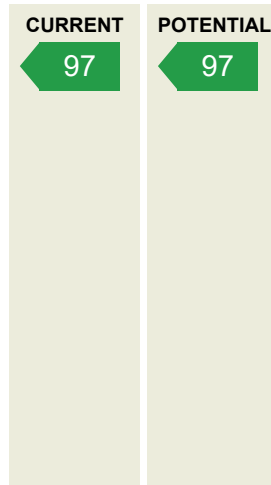
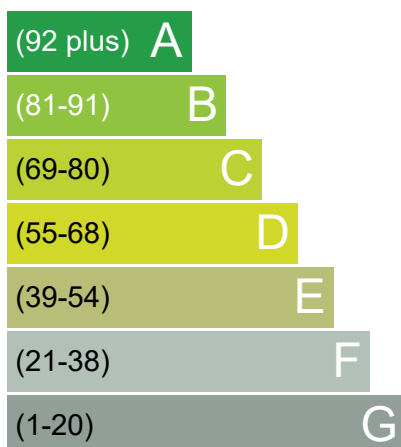
Energy Efficiency Rating

Most energy efficient - lower running costs

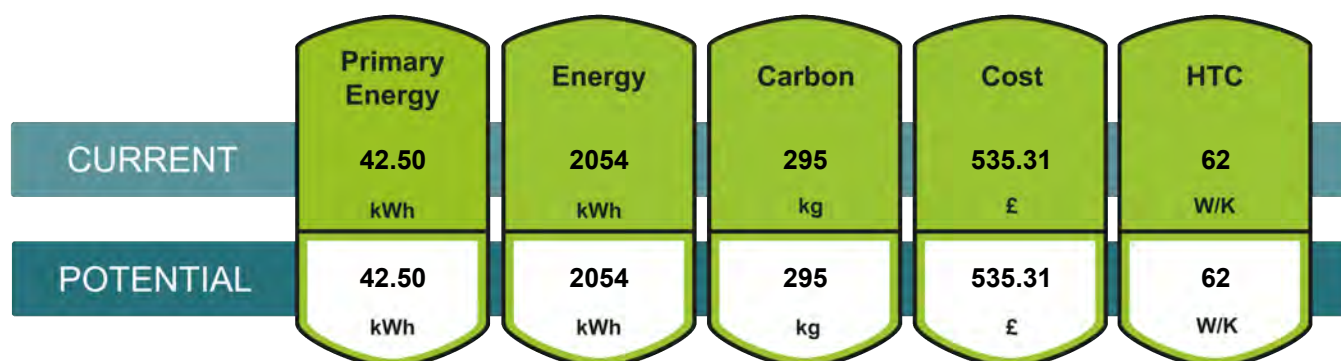


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£54	£54	
Heating		£110	£110	
Hot Water		£371	£371	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£535	£535	

Estimated energy use and potential savings



Space Heating

423

kWh per year



Water Heating

847

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

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

Full SAP Calculation Printout



Property Reference	Block D Flat 11				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	83 B	DER	4.20	TER	10.34	
Environmental	97 A	% DER < TER				59.38
CO ₂ Emissions (t/year)	0.29	DFEE	28.19	TFEE	29.65	
Compliance Check	See BREL	% DFEE < TFEE				4.92
% DPER < TPER	16.79	DPER	44.73	TPER	53.76	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		
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	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)

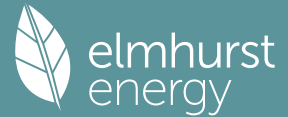
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.2167	0.2125	0.2083	0.1870	0.1827	0.1615	0.1615	0.1573	0.1700	0.1827	0.1913	0.1998 (22b)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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							
Opening Type 1			13.1000	1.3258	17.3674		(27)
External Wall 1	26.0000	13.1000	12.9000	0.1800	2.3220	190.0000	2450.9998 (29a)
External Roof 1	74.0000		74.0000	0.1300	9.6200	9.0000	666.0000 (30)
Total net area of external elements Aum(A, m ²)			100.0000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	29.3094		(33)
Main dwelling							
Party Floor 1			74.0000			30.0000	2220.0000 (32d)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		5336.9998 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							72.1216 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.0000	0.0000	
E16 Corner (normal)				10.4000	0.0000	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	29.3094 (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

Full SAP Calculation Printout



(38)m	33.2374	33.1795	33.1228	32.8561	32.8062	32.5740	32.5740	32.5310	32.6635	32.8062	32.9072	33.0127 (38)
Heat transfer coeff	62.5469	62.4890	62.4322	62.1655	62.1157	61.8834	61.8834	61.8404	61.9729	62.1157	62.2166	62.3221 (39)
Average = Sum(39)m / 12 =												62.1653
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.8452	0.8444	0.8437	0.8401	0.8394	0.8363	0.8363	0.8357	0.8375	0.8394	0.8408	0.8422 (40)
HLP (average)												0.8401
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3392 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	26.7937	26.3892	25.8138	24.9521	24.1756	23.1065	22.2955	23.2872	23.8077	24.8670	25.9683	26.7724	(42b)
Hot water usage for other uses	38.5857	37.1826	35.7795	34.3763	32.9732	31.5701	31.5701	32.9732	34.3763	35.7795	37.1826	38.5857	(42c)
Average daily hot water use (litres/day)													59.9220 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	65.3794	63.5718	61.5933	59.3285	57.1488	54.6766	53.8656	56.2605	58.1841	60.6464	63.1509	65.3581	(44)
Energy conte	96.2498	84.1184	88.0155	77.4978	73.6420	63.2317	59.5230	66.2196	67.4906	78.1491	85.3505	95.9832	(45)
Energy content (annual)										Total = Sum(45)m =			935.4712
Distribution loss (46)m = 0.15 x (45)m	14.4375	12.6178	13.2023	11.6247	11.0463	9.4848	8.9285	9.9329	10.1236	11.7224	12.8026	14.3975	(46)
Water storage loss:													
Store volume													150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.8600 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													1.0044 (55)
Total storage loss	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(56)
If cylinder contains dedicated solar storage	31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(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	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820	(64)
								Total per year (kWh/year) = Sum(64)m =					1575.9732 (64)
12Total per year (kWh/year)													1576 (64)
Electric shower(s)	50.8051	45.2677	49.4306	47.1711	48.0562	45.8410	47.3690	48.0562	47.1711	49.4306	48.5012	50.8051	(64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =					577.9048 (64a)
Heat gains from water heating, kWh/month	88.2234	78.5938	85.1419	79.6760	80.0191	74.6000	75.1527	77.5511	76.3486	81.8613	82.6195	88.1347	(65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	116.9597	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.6419	118.0678	106.6419	110.1966	106.6419	110.1966	106.6419	106.6419	110.1966	106.6419	110.1966	106.6419	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	206.4473	208.5895	203.1911	191.6984	177.1909	163.5559	154.4469	152.3047	157.7031	169.1958	183.7033	197.3383	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	34.6960	(69)
Pumps, fans	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)	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	-93.5678	(71)
Water heating gains (Table 5)	118.5798	116.9551	114.4380	110.6611	107.5525	103.6111	101.0117	104.2354	106.0397	110.0286	114.7494	118.4607	(72)
Total internal gains	489.7569	501.7004	482.3589	470.6440	449.4732	435.4516	420.1884	421.2698	432.0274	443.9542	466.7372	480.5287	(73)

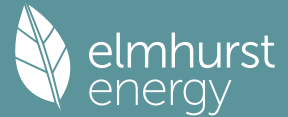
6. Solar gains

[Jan]													
				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W	
Northeast				6.2000	11.2829	0.3500		0.0000		0.7700		18.8527 (75)	
Southeast				2.1000	36.7938	0.3500		0.0000		0.7700		20.8235 (77)	
Northwest				4.8000	11.2829	0.3500		0.0000		0.7700		14.5956 (81)	
Solar gains		54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains		544.0286	605.2554	653.5580	732.2323	787.6225	791.0150	754.7249	695.6522	634.0491	566.3614	533.7655	525.6648 (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	23.7022	23.7242	23.7458	23.8476	23.8668	23.9563	23.9563	23.9730	23.9218	23.8668	23.8281	23.7877	
alpha	2.5801	2.5816	2.5831	2.5898	2.5911	2.5971	2.5971	2.5982	2.5948	2.5911	2.5885	2.5858	
util living area	0.9014	0.8720	0.8260	0.7311	0.6031	0.4555	0.3440	0.3843	0.5701	0.7672	0.8666	0.9084	(86)

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Living	18.8987	19.1855	19.6133	20.1755	20.6095	20.8638	20.9518	20.9347	20.7482	20.1957	19.4714	18.8374
Non living	17.7326	18.0911	18.6238	19.3114	19.8216	20.1030	20.1887	20.1754	19.9880	19.3504	18.4575	17.6575
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	19.9251	19.1855	19.6133	20.1755	20.6095	20.8638	20.9518	20.9347	20.7482	20.1957	19.4714	19.1399 (87)
Th 2	20.2143	20.2150	20.2156	20.2187	20.2193	20.2220	20.2220	20.2225	20.2210	20.2193	20.2181	20.2169 (88)
util rest of house												
MIT 2	0.8922	0.8603	0.8100	0.7069	0.5684	0.4090	0.2880	0.3259	0.5230	0.7406	0.8526	0.8998 (89)
Living area fraction	19.2250	18.0911	18.6238	19.3114	19.8216	20.1030	20.1887	20.1754	19.9880	19.3504	18.4575	18.1187 (90)
MIT	19.5277	18.5644	19.0517	19.6851	20.1623	20.4320	20.5187	20.5037	20.3167	19.7159	18.8960	18.5603 (92)
Temperature adjustment												0.0000
adjusted MIT	19.5277	18.5644	19.0517	19.6851	20.1623	20.4320	20.5187	20.5037	20.3167	19.7159	18.8960	18.5603 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.8832	0.8310	0.7828	0.6890	0.5657	0.4219	0.3097	0.3475	0.5291	0.7215	0.8244	0.8776 (94)
Useful gains	480.4721	502.9416	511.5886	504.4770	445.5915	333.7177	233.7283	241.7193	335.4588	408.6065	440.0292	461.3300 (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	952.4450	853.8721	783.6284	670.4603	525.6422	360.9028	242.5026	253.7747	385.2678	566.2418	733.9042	894.9638 (97)
Space heating kWh	351.1478	235.8253	202.3976	119.5080	59.5577	0.0000	0.0000	0.0000	0.0000	117.2807	211.5900	322.6235 (98a)
Space heating requirement - total per year (kWh/year)												1619.9307
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	351.1478	235.8253	202.3976	119.5080	59.5577	0.0000	0.0000	0.0000	0.0000	117.2807	211.5900	322.6235 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1619.9307
Space heating per m2										(98c) / (4) =		21.8910 (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 %)	306.3574 (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	351.1478	235.8253	202.3976	119.5080	59.5577	0.0000	0.0000	0.0000	0.0000	117.2807	211.5900	322.6235 (98)
Space heating efficiency (main heating system 1)	306.3574	306.3574	306.3574	306.3574	306.3574	0.0000	0.0000	0.0000	0.0000	306.3574	306.3574	306.3574 (210)
Space heating fuel (main heating system)	114.6203	76.9772	66.0658	39.0093	19.4406	0.0000	0.0000	0.0000	0.0000	38.2823	69.0664	105.3095 (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	150.6486	133.2528	142.4143	130.1418	128.0408	115.8757	113.9218	120.6184	120.1346	132.5479	137.9945	150.3820 (64)
Efficiency of water heater (217)m	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602	186.0602 (216)
Fuel for water heating, kWh/month	80.9676	71.6181	76.5421	69.9461	68.8169	62.2786	61.2285	64.8276	64.5676	71.2393	74.1666	80.8244 (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	25.5207	20.4737	18.4343	13.5057	10.4322	8.5232	9.5166	12.3701	16.0675	21.0814	23.8114	26.2300 (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												528.7715 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												186.0602
Water heating fuel used												847.0234 (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)												205.9667 (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												2159.6665 (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	528.7715	0.1552	82.0529 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	847.0234	0.1404	118.9235 (264)
Energy for instantaneous electric shower(s)	577.9048	0.1391	80.3993 (264a)
Space and water heating			200.9764 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	205.9667	0.1443	29.7274 (268)
Total CO2, kg/year			311.1031 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.2000 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	528.7715	1.5745	832.5287 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	847.0234	1.5191	1286.7373 (278)
Energy for instantaneous electric shower(s)	577.9048	1.5143	875.1410 (278a)
Space and water heating			2119.2659 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	205.9667	1.5338	315.9186 (282)
Total Primary energy kWh/year			3310.3256 (286)
Dwelling Primary energy Rate (DPER)			44.7300 (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	74.0000 (1b)	x 2.6000 (2b)	= 192.4000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	192.4000 (5)

2. Ventilation rate

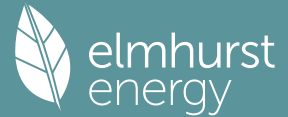
	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1559 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4059 (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) = 0.3450 (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	0.4399	0.4313	0.4227	0.3795	0.3709	0.3278	0.3278	0.3192	0.3450	0.3709	0.3882	0.4054 (22b)
Effective ac	0.5968	0.5930	0.5893	0.5720	0.5688	0.5537	0.5537	0.5509	0.5595	0.5688	0.5753	0.5822 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	26.0000	13.1000	12.9000	0.1800	2.3220		(29a)
External Roof 1	74.0000		74.0000	0.1100	8.1400		(30)
Total net area of external elements Aum(A, m2)			100.0000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		25.4620		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							72.1216 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal) 10.4000 0.0900 0.9360
 Thermal bridges (Sum(L x Psi) calculated using Appendix K) 5.4160 (36)
 Point Thermal bridges (36a) = 0.0000
 Total fabric heat loss (33) + (36) + (36a) = 30.8780 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
 (38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 Heat transfer coeff 37.8898 37.6513 37.4174 36.3190 36.1135 35.1569 35.1569 34.9797 35.5254 36.1135 36.5293 36.9639 (38)
 Heat transfer coeff 68.7678 68.5293 68.2954 67.1970 66.9915 66.0349 66.0349 65.8577 66.4034 66.9915 67.4073 67.8419 (39)
 Average = Sum(39)m / 12 = 67.1960
 HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 HLP (average) 0.9293 0.9261 0.9229 0.9081 0.9053 0.8924 0.8924 0.8900 0.8973 0.9053 0.9109 0.9168 (40)
 Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.3392 (42)
 Hot water usage for mixer showers 63.4403 62.4869 61.0976 58.4395 56.4779 54.2903 53.0469 54.4256 55.9370 58.2858 61.0010 63.1972 (42a)
 Hot water usage for baths 27.4046 26.9976 26.4245 25.3677 24.5764 23.6990 23.2251 23.7942 24.4139 25.3527 26.4313 27.3120 (42b)
 Hot water usage for other uses 38.5857 37.1826 35.7795 34.3763 32.9732 31.5701 31.5701 32.9732 34.3763 35.7795 37.1826 38.5857 (42c)
 Average daily hot water use (litres/day) 118.9761 (43)
 Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 Energy conte 129.4306 126.6671 123.3016 118.1836 114.0275 109.5594 107.8421 111.1931 114.7272 119.4180 124.6149 129.0949 (44)
 Energy content (annual) 204.9864 180.3722 189.5099 161.7874 153.5030 134.7161 130.4256 137.6802 141.4701 162.0491 177.5367 202.1314 (45)
 Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 1976.1681
 30.7480 27.0558 28.4265 24.2681 23.0254 20.2074 19.5638 20.6520 21.2205 24.3074 26.6305 30.3197 (46)
 Water storage loss:
 Store volume 150.0000 (47)
 a) If manufacturer declared loss factor is known (kWh/day): 1.3938 (48)
 Temperature factor from Table 2b 0.5400 (49)
 Enter (49) or (54) in (55) 0.7527 (55)
 Total storage loss
 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (56)
 If cylinder contains dedicated solar storage
 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (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
 251.5813 222.4579 236.1048 206.8792 200.0979 179.8079 177.0205 184.2751 186.5620 208.6440 222.6285 248.7263 (62)
 WWHRs -29.0022 -25.6498 -26.8590 -22.2403 -20.7272 -17.7364 -16.6250 -17.6791 -18.3508 -21.6335 -24.5082 -28.4652 (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 222.5790 196.8081 209.2458 184.6389 179.3707 162.0715 160.3955 166.5961 168.2112 187.0105 198.1204 220.2611 (64)
 Total per year (kWh/year) = Sum(64)m = 2255.3088 (64)
 2255 (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)
 Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)
 Heat gains from water heating, kWh/month 105.4339 93.6423 100.2880 89.8678 88.3157 80.8666 80.6424 83.0546 83.1123 91.1572 95.1044 104.4846 (65)

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

Metabolic gains (Table 5), Watts
 (66)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 116.9597 (66)
 Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 106.6419 118.0678 106.6419 110.1966 106.6419 110.1966 106.6419 106.6419 110.1966 106.6419 110.1966 106.6419 (67)
 Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 206.4473 208.5895 203.1911 191.6984 177.1909 163.5559 154.4469 152.3047 157.7031 169.1958 183.7033 197.3383 (68)
 Pumps, fans 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 34.6960 (69)
 Losses e.g. evaporation (negative values) (Table 5) 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 (70)
 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 -93.5678 (71)
 Water heating gains (Table 5) 141.7122 139.3487 134.7956 124.8164 118.7038 112.3147 108.3904 111.6325 115.4337 122.5232 132.0895 140.4363 (72)
 Total internal gains 515.8893 527.0940 505.7165 487.7993 463.6246 444.1552 427.5671 428.6670 441.4214 459.4488 487.0773 505.5044 (73)

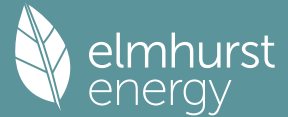
6. Solar gains

[Jan] Area m2 Solar flux Table 6a W/m2 g Specific data or Table 6b FF Specific data or Table 6c Access factor Table 6d Gains W
 Northeast 6.2000 11.2829 0.6300 0.7000 0.7700 21.3789 (75)
 Southeast 2.1000 36.7938 0.6300 0.7000 0.7700 23.6138 (77)
 Northwest 4.8000 11.2829 0.6300 0.7000 0.7700 16.5514 (81)
 Solar gains 61.5442 117.4314 194.1398 296.6411 383.4613 403.2089 379.3644 311.1496 229.0926 138.8097 76.0101 51.1843 (83)
 Total gains 577.4335 644.5254 699.8563 784.4404 847.0859 847.3641 806.9315 739.8166 670.5140 598.2586 563.0874 556.6887 (84)

7. Mean internal temperature (heating season)

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

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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	21.5580	21.6331	21.7072	22.0620	22.1297	22.4503	22.4503	22.5106	22.3257	22.1297	21.9932	21.8523
alpha	2.4372	2.4422	2.4471	2.4708	2.4753	2.4967	2.4967	2.5007	2.4884	2.4753	2.4662	2.4568
util living area	0.8973	0.8673	0.8203	0.7245	0.5969	0.4505	0.3416	0.3824	0.5692	0.7642	0.8629	0.9040 (86)
MIT	18.7019	19.0124	19.4780	20.0990	20.5672	20.8483	20.9446	20.9255	20.7168	20.1171	19.3414	18.6659 (87)
Th 2	20.1427	20.1454	20.1481	20.1606	20.1630	20.1740	20.1740	20.1760	20.1698	20.1630	20.1582	20.1533 (88)
util rest of house	0.8873	0.8547	0.8031	0.6989	0.5604	0.4020	0.2827	0.3212	0.5198	0.7362	0.8480	0.8946 (89)
MIT 2	17.4426	17.8314	18.4118	19.1761	19.7266	20.0434	20.1366	20.1234	19.9108	19.2159	18.2580	17.4039 (90)
Living area fraction	17.9872	18.3421	18.8729	19.5752	20.0901	20.3915	20.4860	20.4703	20.2593	19.6056	18.7265	17.9496 (91)
MIT	17.9872	18.3421	18.8729	19.5752	20.0901	20.3915	20.4860	20.4703	20.2593	19.6056	18.7265	17.9496 (92)
Temperature adjustment												0.0000
adjusted MIT	17.9872	18.3421	18.8729	19.5752	20.0901	20.3915	20.4860	20.4703	20.2593	19.6056	18.7265	17.9496 (93)

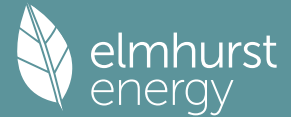
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.8556	0.8226	0.7733	0.6794	0.5571	0.4151	0.3054	0.3435	0.5254	0.7152	0.8174	0.8637 (94)
Useful gains	494.0394	530.1582	541.2108	532.9563	471.8706	351.7475	246.4070	254.1618	352.2632	427.8976	460.2527	480.7949 (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	941.2371	921.1757	845.0095	717.3396	562.0677	382.4387	256.6113	268.0574	409.0009	603.3007	783.7100	932.8013 (97)
Space heating kWh	332.7151	262.7638	226.0262	132.7559	67.1067	0.0000	0.0000	0.0000	0.0000	130.4999	232.8893	336.2928 (98a)
Space heating requirement - total per year (kWh/year)												1721.0496
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	332.7151	262.7638	226.0262	132.7559	67.1067	0.0000	0.0000	0.0000	0.0000	130.4999	232.8893	336.2928 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1721.0496
Space heating per m2										(98c) / (4) =		23.2574 (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	332.7151	262.7638	226.0262	132.7559	67.1067	0.0000	0.0000	0.0000	0.0000	130.4999	232.8893	336.2928 (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)	360.4714	284.6845	244.8822	143.8309	72.7050	0.0000	0.0000	0.0000	0.0000	141.3867	252.3177	364.3475 (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	222.5790	196.8081	209.2458	184.6389	179.3707	162.0715	160.3955	166.5961	168.2112	187.0105	198.1204	220.2611 (64)
Efficiency of water heater (217)m	84.9593	84.7087	84.2331	83.3326	82.0645	79.8000	79.8000	79.8000	79.8000	83.2687	84.4233	79.8000 (216)
Fuel for water heating, kWh/month	261.9832	232.3351	248.4127	221.5685	218.5728	203.0972	200.9969	208.7670	210.7910	224.5868	234.6749	259.1130 (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	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	22.1581	17.7760	16.0053	11.7262	9.0577	7.4002	8.2627	10.7402	13.9504	18.3037	20.6740	22.7739 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-34.6470	-48.8615	-70.2632	-79.0451	-85.2832	-79.6290	-78.6490	-74.2251	-66.4236	-55.8927	-38.0974	-29.9529 (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	-19.5283	-41.0871	-81.6732	-122.6800	-162.2226	-162.9923	-161.0698	-136.3708	-99.9500	-58.7583	-26.0738	-15.4417 (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												1864.6258 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												79.8000
Water heating fuel used												2724.8991 (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)												178.8284 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-1828.8177 (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)

Full SAP Calculation Printout



Total delivered energy for all uses

3025.5356 (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	1864.6258	0.2100	391.5714	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2724.8991	0.2100	572.2288	(264)
Space and water heating			963.8002	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	178.8284	0.1443	25.8105	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-740.9697	0.1346	-99.7152	
PV Unit electricity exported	-1087.8480	0.1259	-136.9534	
Total			-236.6686	(269)
Total CO2, kg/year			764.8713	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.3400	(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	1864.6258	1.1300	2107.0271	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2724.8991	1.1300	3079.1360	(278)
Space and water heating			5186.1631	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	178.8284	1.5338	274.2930	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-740.9697	1.4974	-1109.4998	
PV Unit electricity exported	-1087.8480	0.4621	-502.7132	
Total			-1612.2130	(283)
Total Primary energy kWh/year			3978.3439	(286)
Target Primary Energy Rate (TPER)			53.7600	(287)

Energy Report



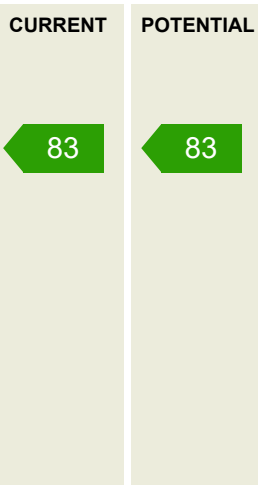
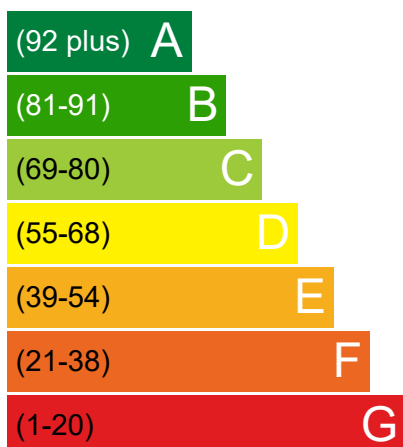
Dwelling Address	
Reference	Block D Flat 11-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	74

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

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

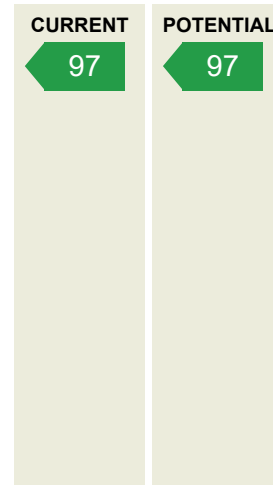
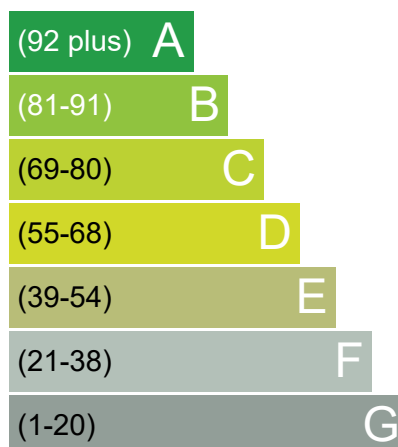
Energy Efficiency Rating

Most energy efficient - lower running costs

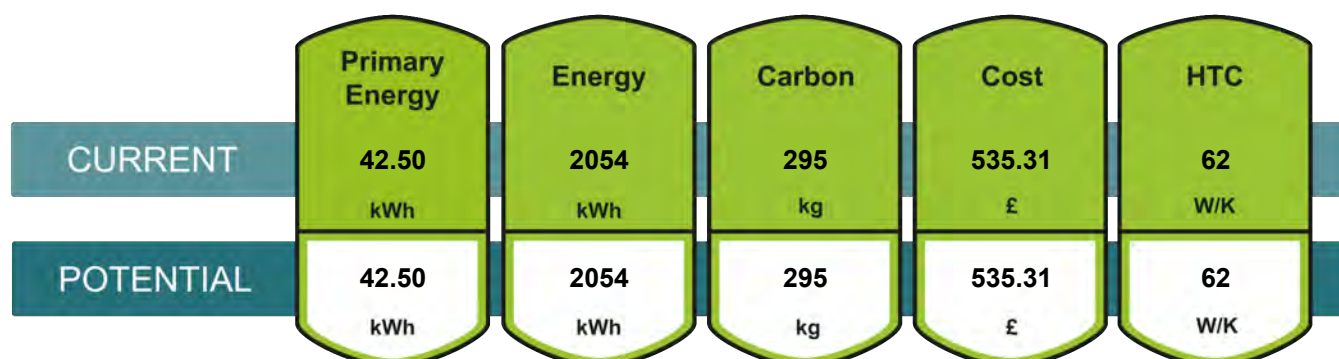


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£54	£54	
Heating		£110	£110	
Hot Water		£371	£371	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£535	£535	

Estimated energy use and potential savings



Space Heating

423

kWh per year



Water Heating

847

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

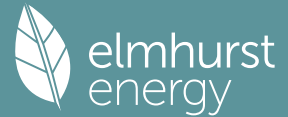
This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.

Full SAP Calculation Printout



Property Reference	Block D Flat 12				Issued on Date	15/04/2025
Assessment Reference	Be Green		Prop Type Ref			
Property						
SAP Rating	83 B	DER	4.01	TER	9.71	
Environmental	96 A	% DER < TER				58.70
CO ₂ Emissions (t/year)	0.35	DFEE	31.16	TFEE	32.10	
Compliance Check	See BREL	% DFEE < TFEE				2.95
% DPER < TPER	16.02	DPER	42.42	TPER	50.52	
Assessor Details	Mr. Joe Mountain				Assessor ID	AV71-0001
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	93.0000 (1b)	2.6000 (2b)	241.8000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		4 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	241.8000 (5)

2. Ventilation rate

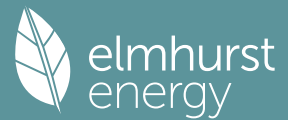
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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)
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)
Effective ac	0.5235	0.5226	0.5217	0.5175	0.5167	0.5130	0.5130	0.5124	0.5144	0.5167	0.5183	0.5200 (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												
Opening Type 1			13.1000	1.3258	17.3674			(27)				
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860	190.0000	13812.9994	(29a)				
External Roof 1	93.0000		93.0000	0.1300	12.0900	9.0000	837.0000	(30)				
Total net area of external elements Aum(A, m2)			178.8000					(31)				
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	42.5434			(33)				
Main dwelling												
Party Floor 1			93.0000			30.0000	2790.0000	(32d)				
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	17439.9994	(34)				
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							187.5269	(35)				
List of Thermal Bridges												
K1 Element				Length	Psi-value	Total						
E5 Ground floor (normal)				28.0000	0.0000	0.0000						
E16 Corner (normal)				10.4000	0.0000	0.0000						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							0.0000	(36)				
Point Thermal bridges						(36a) =	0.0000					
Total fabric heat loss						(33) + (36) + (36a) =	42.5434	(37)				
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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(38)m	41.7714	41.6986	41.6273	41.2922	41.2295	40.9376	40.9376	40.8836	41.0500	41.2295	41.3563	41.4889 (38)
Heat transfer coeff	84.3148	84.2420	84.1707	83.8356	83.7729	83.4810	83.4810	83.4270	83.5934	83.7729	83.8997	84.0323 (39)
Average = Sum(39)m / 12 =												83.8353

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9066	0.9058	0.9051	0.9015	0.9008	0.8976	0.8976	0.8971	0.8989	0.9008	0.9021	0.9036 (40)
HLP (average)												0.9015
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.6646 (42)
Hot water usage for mixer showers												
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths												
29.0877	28.6486	28.0239	27.0884	26.2454	25.0848	24.2043	25.2810	25.8461	26.9960	28.1916	29.0646	(42b)
Hot water usage for other uses												
41.9181	40.3938	38.8695	37.3453	35.8210	34.2967	34.2967	35.8210	37.3453	38.8695	40.3938	41.9181	(42c)
Average daily hot water use (litres/day)												65.0786 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	71.0058	69.0424	66.8935	64.4337	62.0663	59.3815	58.5010	61.1019	63.1913	65.8656	68.5854	70.9827 (44)
Energy conte	104.5328	91.3571	95.5894	84.1665	79.9787	68.6727	64.6453	71.9181	73.2988	84.8744	92.6955	104.2433 (45)
Energy content (annual)										Total = Sum(45)m =		1015.9726
Distribution loss (46)m = 0.15 x (45)m												
15.6799	13.7036	14.3384	12.6250	11.9968	10.3009	9.6968	10.7877	10.9948	12.7312	13.9043	15.6365	(46)
Water storage loss:												
Store volume												150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.8600 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												1.0044 (55)
Total storage loss												
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(56)
If cylinder contains dedicated solar storage												
31.1364	28.1232	31.1364	30.1320	31.1364	30.1320	31.1364	31.1364	30.1320	31.1364	30.1320	31.1364	(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	(61)
Total heat required for water heating calculated for each month												
158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h												
158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		1656.4746 (64)
Electric shower(s)												1656 (64)
55.1745	49.1609	53.6818	51.2279	52.1892	49.7834	51.4428	52.1892	51.2279	53.6818	52.6724	55.1745	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												627.6062 (64a)
Heat gains from water heating, kWh/month												
92.0698	81.9740	88.7230	82.9075	83.1593	77.3947	77.8743	80.4791	79.2940	85.1602	86.1046	91.9736	(65)

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

Metabolic gains (Table 5), Watts												
(66)m	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	133.2299	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
132.1206	146.2764	132.1206	136.5246	132.1206	136.5246	132.1206	132.1206	136.5246	132.1206	136.5246	132.1206	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
244.4900	247.0270	240.6338	227.0233	209.8424	193.6949	182.9074	180.3703	186.7636	200.3741	217.5549	233.7024	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	36.3230	(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	(70)
Losses e.g. evaporation (negative values) (Table 5)												
-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	-106.5839	(71)
Water heating gains (Table 5)												
123.7497	121.9851	119.2513	115.1494	111.7732	107.4927	104.6698	108.1708	110.1306	114.4627	119.5897	123.6204	(72)
Total internal gains												
563.3293	578.2574	554.9746	541.6662	516.7052	500.6811	482.6667	483.6307	496.3877	509.9263	536.6381	552.4124	(73)

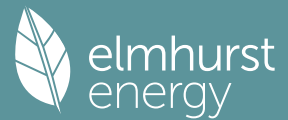
6. Solar gains

[Jan]			Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W				
Northeast			6.2000	11.2829	0.3500	0.0000	0.7700	18.8527 (75)				
Southeast			2.1000	36.7938	0.3500	0.0000	0.7700	20.8235 (77)				
Northwest			4.8000	11.2829	0.3500	0.0000	0.7700	14.5956 (81)				
Solar gains	54.2717	103.5550	171.1991	261.5883	338.1493	355.5634	334.5365	274.3823	202.0217	122.4072	67.0283	45.1361 (83)
Total gains	617.6010	681.8124	726.1737	803.2544	854.8545	856.2445	817.2032	758.0131	698.4094	632.3335	603.6664	597.5485 (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 from living area, nil,m (see Table 9a)												
tau	57.4566	57.5063	57.5550	57.7851	57.8283	58.0305	58.0305	58.0681	57.9524	57.8283	57.7409	57.6498
alpha	4.8304	4.8338	4.8370	4.8523	4.8552	4.8687	4.8687	4.8712	4.8635	4.8552	4.8494	4.8433
util living area												
0.9894	0.9818	0.9655	0.9099	0.7886	0.5988	0.4444	0.4970	0.7418	0.9317	0.9798	0.9910	(86)

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Living	19.7883	19.9554	20.2100	20.5684	20.8402	20.9671	20.9937	20.9893	20.9105	20.5705	20.1252	19.7530
Non living	18.7419	18.9542	19.2753	19.7158	20.0234	20.1476	20.1668	20.1650	20.1008	19.7265	19.1734	18.6989
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	20.3801	19.9554	20.2100	20.5684	20.8402	20.9671	20.9937	20.9893	20.9105	20.5705	20.1252	19.9274 (87)
Th 2	20.1619	20.1625	20.1632	20.1663	20.1668	20.1695	20.1695	20.1700	20.1685	20.1668	20.1657	20.1645 (88)
util rest of house												
	0.9870	0.9776	0.9572	0.8887	0.7439	0.5300	0.3629	0.4116	0.6768	0.9110	0.9743	0.9889 (89)
MIT 2	19.5958	18.9542	19.2753	19.7158	20.0234	20.1476	20.1668	20.1650	20.1008	19.7265	19.1734	18.9630 (90)
Living area fraction												
MIT	19.7307	19.1265	19.4361	19.8625	20.1639	20.2886	20.3090	20.3068	20.2401	19.8717	19.3372	19.1289 (92)
Temperature adjustment												0.0000
adjusted MIT	19.7307	19.1265	19.4361	19.8625	20.1639	20.2886	20.3090	20.3068	20.2401	19.8717	19.3372	19.1289 (93)

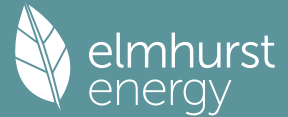
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9854	0.9707	0.9482	0.8798	0.7437	0.5402	0.3768	0.4259	0.6828	0.9022	0.9672	0.9854 (94)
Useful gains	608.6113	661.8304	688.5455	706.6983	635.7461	462.5105	307.9221	322.8689	476.8689	570.4735	583.8455	588.8161 (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	1301.0383	1198.4655	1088.8401	919.0443	709.0493	474.8928	309.6337	325.9348	513.2719	776.7185	1026.6960	1254.5125 (97)
Space heating kWh	515.1657	360.6188	297.8192	152.8892	54.5375	0.0000	0.0000	0.0000	0.0000	153.4463	318.8524	495.2781 (98a)
Space heating requirement - total per year (kWh/year)												2348.6073
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	515.1657	360.6188	297.8192	152.8892	54.5375	0.0000	0.0000	0.0000	0.0000	153.4463	318.8524	495.2781 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2348.6073
Space heating per m2										(98c) / (4) =		25.2538 (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 %)												302.9509 (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	515.1657	360.6188	297.8192	152.8892	54.5375	0.0000	0.0000	0.0000	0.0000	153.4463	318.8524	495.2781 (98)
Space heating efficiency (main heating system 1)	302.9509	302.9509	302.9509	302.9509	302.9509	0.0000	0.0000	0.0000	0.0000	302.9509	302.9509	302.9509 (210)
Space heating fuel (main heating system)	170.0492	119.0354	98.3061	50.4666	18.0021	0.0000	0.0000	0.0000	0.0000	50.6505	105.2489	163.4846 (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	158.9316	140.4915	149.9882	136.8105	134.3775	121.3167	119.0441	126.3169	125.9428	139.2732	145.3395	158.6421 (64)
Efficiency of water heater (217)m	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000	184.2000 (216)
Fuel for water heating, kWh/month	86.2821	76.2712	81.4268	74.2728	72.9520	65.8614	64.6276	68.5760	68.3728	75.6098	78.9031	86.1249 (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	32.8170	26.3270	23.7045	17.3670	13.4147	10.9600	12.2374	15.9066	20.6611	27.1085	30.6190	33.7291 (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												775.2435 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												184.2000
Water heating fuel used												899.2805 (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)												264.8519 (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												2566.9820 (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	775.2435	0.1559	120.8266 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	899.2805	0.1405	126.3110 (264)
Energy for instantaneous electric shower(s)	627.6062	0.1391	87.3139 (264a)
Space and water heating			247.1376 (265)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (267)
Energy for lighting	264.8519	0.1443	38.2263 (268)
Total CO2, kg/year			372.6778 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.0100 (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	775.2435	1.5770	1222.5547 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	899.2805	1.5193	1366.3119 (278)
Energy for instantaneous electric shower(s)	627.6062	1.5143	950.4055 (278a)
Space and water heating			2588.8666 (279)
Pumps, fans and electric keep-hot	0.0000	0.0000	0.0000 (281)
Energy for lighting	264.8519	1.5338	406.2386 (282)
Total Primary energy kWh/year			3945.5107 (286)
Dwelling Primary energy Rate (DPER)			42.4200 (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	93.0000 (1b)	x 2.6000 (2b)	= 241.8000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	241.8000 (5)

2. Ventilation rate

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

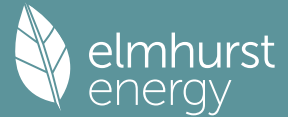
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1241 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3741	(18)
Number of sides sheltered	2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3180 (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	0.4054	0.3974	0.3895	0.3498	0.3418	0.3021	0.3021	0.2941	0.3180	0.3418	0.3577	0.3736 (22b)
Effective ac	0.5822	0.5790	0.5759	0.5612	0.5584	0.5456	0.5456	0.5433	0.5505	0.5584	0.5640	0.5698 (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 Opening Type			13.1000	1.1450	15.0000		(27)
External Wall 1	85.8000	13.1000	72.7000	0.1800	13.0860		(29a)
External Roof 1	93.0000		93.0000	0.1100	10.2300		(30)
Total net area of external elements Aum(A, m2)			178.8000				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		38.3160		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							187.5269 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E5 Ground floor (normal)				28.0000	0.1600	4.4800	

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E16 Corner (normal)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)
Point Thermal bridges
Total fabric heat loss

10.4000 0.0900 0.9360 5.4160 (36)
(33) + (36) + (36a) = 0.0000
43.7320 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)
(38)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Heat transfer coeff 46.4540 46.1994 45.9498 44.7775 44.5582 43.5372 43.5372 43.3482 43.9305 44.5582 45.0019 45.4658 (38)
90.1860 89.9314 89.6818 88.5095 88.2902 87.2692 87.2692 87.0802 87.6625 88.2902 88.7339 89.1978 (39)
Average = Sum(39)m / 12 = 88.5085

HLP Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
HLP (average) 0.9697 0.9670 0.9643 0.9517 0.9494 0.9384 0.9384 0.9363 0.9426 0.9494 0.9541 0.9591 (40)
Days in mont 31 28 31 30 31 30 31 31 30 31 30 31

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.6646 (42)
Hot water usage for mixer showers 68.8963 67.8609 66.3522 63.4655 61.3351 58.9594 57.6091 59.1064 60.7477 63.2985 66.2473 68.6323 (42a)
Hot water usage for baths 29.7509 29.3090 28.6868 27.5396 26.6806 25.7280 25.2135 25.8314 26.5041 27.5233 28.6942 29.6503 (42b)
Hot water usage for other uses 41.9181 40.3938 38.8695 37.3453 35.8210 34.2967 34.2967 35.8210 37.3453 38.8695 40.3938 41.9181 (42c)
Average daily hot water use (litres/day) 129.2112 (43)

Daily hot water use Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Energy conte 140.5653 137.5638 133.9086 128.3503 123.8366 118.9841 117.1192 120.7587 124.5971 129.6914 135.3353 140.2008 (44)
Energy content (annual) 222.6211 195.8890 205.8125 175.7052 166.7079 146.3048 141.6456 149.5245 153.6407 175.9900 192.8100 219.5205 (45)
Distribution loss (46)m = 0.15 x (45)m Total = Sum(45)m = 2146.1718
33.3932 29.3834 30.8719 26.3558 25.0062 21.9457 21.2468 22.4287 23.0461 26.3985 28.9215 32.9281 (46)

Water storage loss:
Store volume 150.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):
Temperature factor from Table 2b 1.3938 (48)
Enter (49) or (54) in (55) 0.5400 (49)
Total storage loss 0.7527 (55)
23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (56)

If cylinder contains dedicated solar storage 23.3325 21.0745 23.3325 22.5798 23.3325 22.5798 23.3325 23.3325 22.5798 23.3325 22.5798 23.3325 (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
269.2160 237.9747 252.4074 220.7970 213.3028 191.3967 188.2405 196.1194 198.7325 222.5849 237.9018 266.1154 (62)
WWHRS -31.4965 -27.8558 -29.1690 -24.1531 -22.5098 -19.2618 -18.0548 -19.1995 -19.9290 -23.4941 -26.6159 -30.9132 (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 237.7195 210.1190 223.2384 196.6439 190.7931 172.1349 170.1856 176.9199 178.8035 199.0909 211.2859 235.2022 (64)
Total per year (kWh/year) = Sum(64)m = 2402.1368 (64)
2402 (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)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month
111.2974 98.8017 105.7086 94.4954 92.7063 84.7198 84.3731 86.9928 87.1590 95.7926 100.1828 110.2665 (65)

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

Metabolic gains (Table 5), Watts
(66)m Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 133.2299 (66)
132.1206 146.2764 132.1206 136.5246 132.1206 136.5246 132.1206 132.1206 136.5246 132.1206 136.5246 132.1206 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5 244.4900 247.0270 240.6338 227.0233 209.8424 193.6949 182.9074 180.3703 186.7636 200.3741 217.5549 233.7024 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 36.3230 (69)
Pumps, fans 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5) -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 -106.5839 (71)
Water heating gains (Table 5) 149.5933 147.0263 142.0814 131.2437 124.6053 117.6664 113.4047 116.9258 121.0542 128.7535 139.1428 148.2077 (72)
Total internal gains 592.1729 606.2986 580.8047 560.7605 532.5373 510.8549 491.4016 492.3857 507.3113 527.2171 559.1912 579.9996 (73)

6. Solar gains

[Jan] Area Solar flux g FF Access Gains
m2 Table 6a W/m2 Specific data Specific data factor W
or Table 6b or Table 6c Table 6d

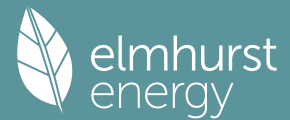
Northeast 6.2000 11.2829 0.6300 0.7000 0.7700 21.3789 (75)
Southeast 2.1000 36.7938 0.6300 0.7000 0.7700 23.6138 (77)
Northwest 4.8000 11.2829 0.6300 0.7000 0.7700 16.5514 (81)

Solar gains 61.5442 117.4314 194.1398 296.6411 383.4613 403.2089 379.3644 311.1496 229.0926 138.8097 76.0101 51.1843 (83)
Total gains 653.7170 723.7300 774.9445 857.4016 915.9986 914.0638 870.7660 803.5353 736.4039 666.0269 635.2013 631.1840 (84)

7. Mean internal temperature (heating season)

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

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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	53.7162	53.8682	54.0182	54.7336	54.8695	55.5115	55.5115	55.6320	55.2624	54.8695	54.5952	54.3113	
alpha	4.5811	4.5912	4.6012	4.6489	4.6580	4.7008	4.7008	4.7088	4.6842	4.6580	4.6397	4.6208	
util living area	0.9875	0.9788	0.9605	0.9009	0.7755	0.5861	0.4357	0.4889	0.7347	0.9265	0.9771	0.9893	(86)
MIT	19.7112	19.8918	20.1661	20.5509	20.8333	20.9656	20.9930	20.9883	20.9038	20.5468	20.0789	19.6875	(87)
Th 2	20.1086	20.1109	20.1132	20.1238	20.1257	20.1350	20.1350	20.1367	20.1314	20.1257	20.1217	20.1175	(88)
util rest of house	0.9846	0.9739	0.9510	0.8777	0.7285	0.5157	0.3525	0.4015	0.6674	0.9042	0.9710	0.9867	(89)
MIT 2	18.6056	18.8358	19.1821	19.6589	19.9778	20.1124	20.1321	20.1314	20.0594	19.6646	19.0826	18.5820	(90)
Living area fraction									FLA = Living area /	(4) =		0.1720	(91)
MIT	18.7958	19.0175	19.3514	19.8124	20.1250	20.2592	20.2802	20.2788	20.2046	19.8164	19.2540	18.7722	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7958	19.0175	19.3514	19.8124	20.1250	20.2592	20.2802	20.2788	20.2046	19.8164	19.2540	18.7722	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9787	0.9660	0.9409	0.8682	0.7284	0.5261	0.3667	0.4162	0.6735	0.8947	0.9629	0.9814	(94)
Useful gains	639.7653	699.0984	729.1069	744.4002	667.2456	480.9170	319.2954	334.4364	495.9822	595.8836	611.6163	619.4519	(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	1307.3190	1269.6020	1152.5365	965.8494	743.8419	493.8731	321.1666	337.7672	535.1483	813.7160	1078.4714	1299.8077	(97)
Space heating kWh	496.6599	383.3784	315.0316	159.4434	56.9876	0.0000	0.0000	0.0000	0.0000	162.0673	336.1356	506.1847	(98a)
Space heating requirement - total per year (kWh/year)												2415.8887	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)												0.0000	
Space heating kWh	496.6599	383.3784	315.0316	159.4434	56.9876	0.0000	0.0000	0.0000	0.0000	162.0673	336.1356	506.1847	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2415.8887	
Space heating per m2										(98c) / (4) =		25.9773	(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	496.6599	383.3784	315.0316	159.4434	56.9876	0.0000	0.0000	0.0000	0.0000	162.0673	336.1356	506.1847	(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)	538.0931	415.3612	341.3127	172.7448	61.7417	0.0000	0.0000	0.0000	0.0000	175.5876	364.1773	548.4125	(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	237.7195	210.1190	223.2384	196.6439	190.7931	172.1349	170.1856	176.9199	178.8035	199.0909	211.2859	235.2022	(64)	
Efficiency of water heater (217)m	85.6723	85.3905	84.8320	83.5936	81.7045	79.8000	79.8000	79.8000	79.8000	83.6023	85.0958	79.8000	(216)	
Fuel for water heating, kWh/month	277.4753	246.0684	263.1534	235.2380	233.5159	215.7079	213.2652	221.7041	224.0646	238.1405	248.2918	274.3442	(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	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	27.4520	22.0231	19.8293	14.5278	11.2217	9.1682	10.2368	13.3062	17.2834	22.6768	25.6134	28.2150	(232)	
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-42.8679	-60.1031	-85.9077	-96.0115	-103.0178	-95.9434	-94.7345	-89.6785	-80.6867	-68.4414	-47.0020	-37.0990	(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	-25.2173	-52.9405	-105.0395	-157.5079	-208.0367	-208.9726	-206.5338	-174.9893	-128.4045	-75.6471	-33.6456	-19.9509	(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												2617.4309	(211)	
Space heating fuel - main system 2												0.0000	(213)	
Space heating fuel - secondary												0.0000	(215)	
Efficiency of water heater												79.8000		
Water heating fuel used												2890.9693	(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)												221.5538	(232)	
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation												-2298.3790	(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

3517.5750 (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	2617.4309	0.2100	549.6605 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2890.9693	0.2100	607.1036 (264)
Space and water heating			1156.7640 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	221.5538	0.1443	31.9771 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	0.1347	-121.4448
PV Unit electricity exported	-1396.8855	0.1259	-175.9251
Total			-297.3699 (269)
Total CO2, kg/year			903.3005 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.7100 (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	2617.4309	1.1300	2957.6969 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2890.9693	1.1300	3266.7954 (278)
Space and water heating			6224.4922 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	221.5538	1.5338	339.8266 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-901.4935	1.4979	-1350.3395
PV Unit electricity exported	-1396.8855	0.4623	-645.7684
Total			-1996.1080 (283)
Total Primary energy kWh/year			4698.3116 (286)
Target Primary Energy Rate (TPER)			50.5200 (287)

Energy Report



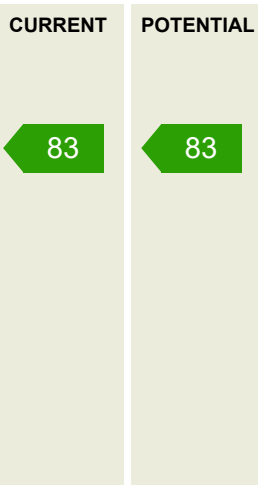
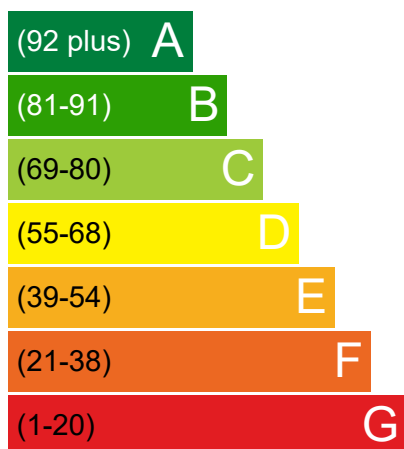
Dwelling Address	
Reference	Block D Flat 12-Be Green
Assessment Date	21/03/2025
Submission Date	
Property Type	Flat, Detached
Total Floor Area	93

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

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

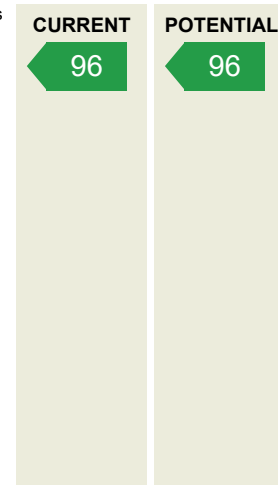
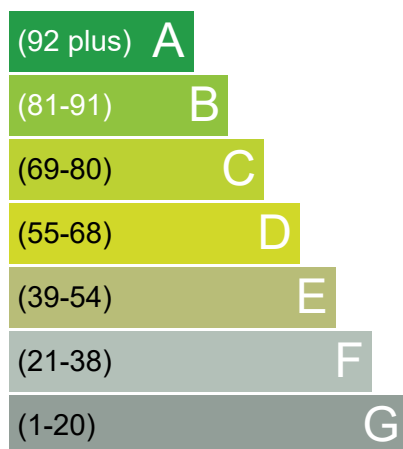
Energy Efficiency Rating

Most energy efficient - lower running costs

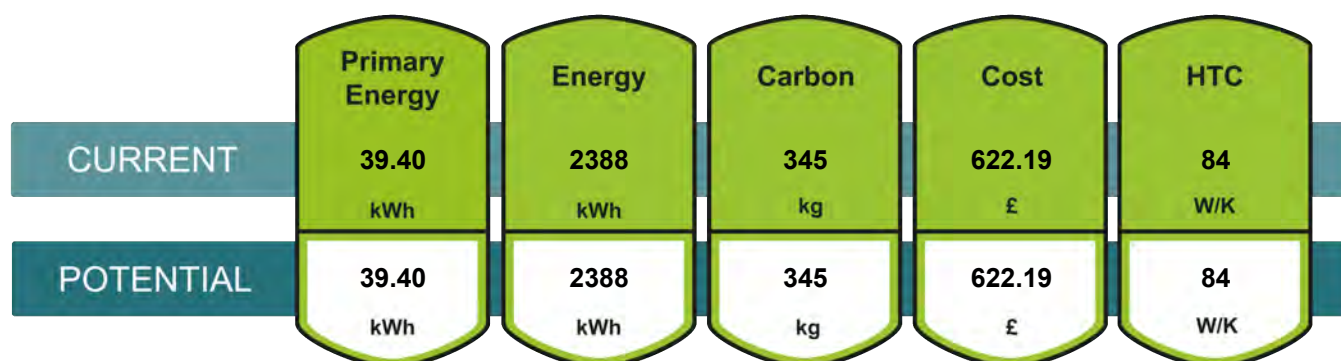


Carbon Dioxide (CO2) Emissions Rating

Very environmentally friendly - lower CO2 emissions



Additional ratings for your home



Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.13 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, underfloor, electric	Very Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Average
Lighting	Excellent lighting efficiency	Very Good
Air tightness	Air permeability [AP50] = 4.0 m ³ /h.m ² (assumed)	Good

Recommendations

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

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

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

Estimated energy costs of the dwelling

Energy Report

The table below shows the estimated running costs of the space and water heating and lighting within the dwelling. It does not include the energy used from household appliances. The estimated annual costs after potential improvements indicates the total energy cost if all recommended measures named above were installed.

		Estimated annual costs	Estimated annual costs after potential improvements	Potential future savings
Lighting		£69	£69	
Heating		£155	£155	
Hot Water		£398	£398	
New Technologies e.g. Impact of PV		£0	£0	
TOTAL		£622	£622	

Estimated energy use and potential savings



Space Heating

596

kWh per year



Water Heating

899

kWh per year

About this document

Created by:

Company/Trading name:

Phone number:

Email address:

Disclaimer

This Energy Report should not under any circumstances be treated as a Condition Survey and cannot be used to indicate that any element of the dwelling (e.g. heating system) is working correctly.

This Energy Report must not be used in situations where an Energy Performance Certificate (EPC) is required.

This Energy Report is generated from a set of data inputs which may not reflect the actual dimensions, services or construction of the dwelling.

The calculation used to generate this report reflects the SAP Methodology current at the time of report generation.

Glossary terms for additional metrics

Primary Energy	The measure of the energy required for lighting, heating and hot water in a property. This includes the efficiency of the property's heating system, power station efficiency for electricity and the energy used to produce the fuel and deliver it to the property.
Energy Used	The estimated amount of fuel energy for lighting, heating and hot water for the property. The estimate is based on typical usage which is likely to be different to actual consumption.
Carbon (CO ₂)	The current emissions based on the energy estimates.
Cost	The estimated cost of energy. The cost of each unit of fuel is based on an industry standard which is likely to be different to those the occupier actually pays.
Heat Transfer Coefficient	Heat flow through the property envelope where internal and external temperatures are different.