

Summary for Input Data



Plot Reference	B 103	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	82 B	DER	5.17	TER	15.64
Environmental	96 A	% DER < TER			66.94
CO ₂ Emissions (t/year)	0.32	DFEE	36.64	TFEE	41.43
Compliance Check	See BREL	% DFEE < TFEE			11.57
% DPER < TPER	35.72	DPER	54.52	TPER	84.82

Assessor Details	Mr. Robert Tanner	Assessor ID	W344-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Northwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Semi-Detached	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	239.13	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	22.31 m	70.76 m ²	2.80 m

8.0 Living Area	24.48	m ²
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Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.15	70.00	48.02	34.57	0.00	None	13.45	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	14.45	12.03	0.70	Stairwell Access Corridor 3	2.42	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	0.00	70.00	33.57	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	155.80

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	70.76

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
Heatloss Floor 1	Exposed Floor - Solid	Lowest occupied	Other	0.10	None	0.00	110.00	70.76

Summary for Input Data

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double Low-E Soft 0.1			0.35		0.70	1.20
Door	Manufacturer	Door to Corridor				0.00			1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	North West	2.42	
NE windows	Windows	External Wall 1	North East	7.33	
SE windows	Windows	External Wall 1	South East	6.12	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	8.49	0.05	0.05	No
E3 Sill	Independently assessed	4.99	0.04	0.04	No
E4 Jamb	Independently assessed	21.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	13.75	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	5.16	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.40	0.10	0.10	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.40	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Table K1 - Default	2.80	0.00	0.00	No
E18 Party wall between dwellings	Independently assessed	5.60	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
E20 Exposed floor (normal)	Independently assessed	13.75	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	5.16	0.10	0.10	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	11.99	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	11.99	0.08	0.08	No
Y-value	0.05			W/m²K	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	2
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	89.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0

Summary for Input Data

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m²/(h.m²) @ 50 Pa

Test Method

22.0 Lighting
No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	15.00	1125.00	8

24.0 Main Heating 1

25.0 Main Heating 2

26.0 Heat Networks

Space Community Heating

Distribution Loss

Distribution Loss Value

SAP Code

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	Heat pump	Electricity	Space and Water	232.00	100.00					
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower	Combi boiler or unvented hot water system	8.00		No	
Shower 2	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Insulation Type

Cylinder Volume L

Loss kWh/day

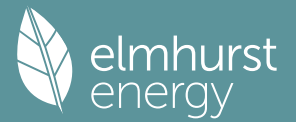
32.0 Photovoltaic Unit

Export Capable Meter?

Connected To Dwelling

Diverter

Summary for Input Data



Battery Capacity [kWh]

0.00

PV Cells kWp

Orientation

Elevation

Overshading

FGHRS

MCS Certificate

**Overshading
Factor**

**MCS
Certificate
Reference**

**Panel
Manufacturer**

0.34

South West

Horizontal

Modest

No

0.80

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

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Environmental	96 A	TER	15.64
CO ₂ Emissions (t/year)	0.32	% DER < TER	66.94
Compliance Check	See BREL	DFEE	36.64
% DPER < TPER	35.72	TFEE	41.43
		% DFEE < TFEE	11.57
		TPER	84.82
Assessor Details	Mr. Robert Tanner	Assessor ID	W344-0001
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	70.7600 (1b)	2.8000 (2b)	198.1280 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.7600		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	198.1280 (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	3.0000	(17)
Infiltration rate	0.1500	(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) =	0.1275 (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	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (25)

3. Heat losses and heat loss parameter

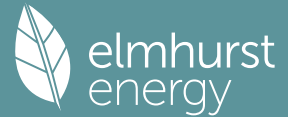
Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Windows			13.4500	1.1450	15.4008		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			70.7600	0.1000	7.0760	110.0000	7783.6000 (28b)
External Wall 1	48.0200	13.4500	34.5700	0.1500	5.1855	70.0000	2419.9000 (29a)
Corridor wall	14.4500	2.4200	12.0300	0.1900	2.2857	70.0000	842.1000 (29a)
Total net area of external elements Aum(A, m ²)			133.2300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.3680		(33)
Main dwelling							
Party Wall 1			33.5700	0.0000	0.0000	70.0000	2349.9000 (32)
Party Ceiling 1			70.7600			30.0000	2122.8000 (32b)
Internal Wall 1			155.8000			9.0000	1402.2000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16920.5000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							239.1252 (35)
List of Thermal Bridges							

Ventilation heat loss calculated monthly (39)m = 0.33 x (25)m x (5)												
(39)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	17.1342	16.9258	16.7174	15.6754	15.4670	14.4250	14.4250	14.2166	14.8418	15.4670	15.8838	16.3006 (39)
Heat transfer coeff	55.9868	55.7784	55.5700	54.5280	54.3196	53.2776	53.2776	53.0692	53.6944	54.3196	54.7364	55.1532 (39)
Average = Sum(39)m / 12 =												54.4759
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.7912	0.7883	0.7853	0.7706	0.7677	0.7529	0.7529	0.7500	0.7588	0.7677	0.7736	0.7794 (40)
HLP (average)												0.7699
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

[illegible]5. Internal gains (see Table 5 and 5a)

6. Solar gains

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[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				7.3300		11.2829		0.3500		0.7000		14.0419 (75)
Southeast				6.1200		36.7938		0.3500		0.7000	0.7700	38.2319 (77)
Solar gains	52.2738	93.7057	140.6011	194.9771	237.3444	243.9653	231.7390	198.8565	159.2308	106.9051	63.4613	44.1858 (83)
Total gains	551.5167	603.7451	630.4610	670.3373	689.8813	679.4279	649.3703	620.2344	591.9067	554.6021	537.3337	534.3953 (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	83.9508	84.2645	84.5805	86.1968	86.5275	88.2199	88.2199	88.5663	87.5350	86.5275	85.8686	85.2197
alpha	6.5967	6.6176	6.6387	6.7465	6.7685	6.8813	6.8813	6.9044	6.8357	6.7685	6.7246	6.6813
util living area	0.9872	0.9751	0.9496	0.8639	0.7062	0.4997	0.3608	0.3932	0.6162	0.8792	0.9696	0.9891 (86)
MIT	20.3428	20.4792	20.6511	20.8637	20.9695	20.9975	20.9998	20.9996	20.9902	20.8692	20.5950	20.3287 (87)
Th 2	20.2609	20.2635	20.2661	20.2789	20.2814	20.2943	20.2943	20.2969	20.2892	20.2814	20.2763	20.2712 (88)
util rest of house	0.9837	0.9687	0.9369	0.8349	0.6595	0.4456	0.3030	0.3333	0.5566	0.8470	0.9607	0.9862 (89)
MIT 2	19.5029	19.6756	19.8892	20.1470	20.2572	20.2929	20.2942	20.2967	20.2830	20.1596	19.8321	19.4934 (90)
Living area fraction										fLA = Living area / (4) =		0.3460 (91)
MIT	19.7935	19.9536	20.1528	20.3949	20.5036	20.5366	20.5383	20.5399	20.5276	20.4051	20.0960	19.7824 (92)
Temperature adjustment												0.0000
adjusted MIT	19.7935	19.9536	20.1528	20.3949	20.5036	20.5366	20.5383	20.5399	20.5276	20.4051	20.0960	19.7824 (93)
8. Space heating requirement												
Utilisation	0.9810	0.9655	0.9347	0.8399	0.6743	0.4642	0.3230	0.3540	0.5769	0.8530	0.9581	0.9838 (94)
Useful gains	541.0544	582.9375	589.2738	562.9947	465.1720	315.4108	209.7642	219.5911	341.4722	473.0646	514.8309	525.7181 (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	867.4300	839.6677	758.6869	626.7962	478.2103	316.2900	209.8239	219.7007	345.1283	532.6095	711.3546	859.4172 (97)
Space heating kWh	242.8235	172.5227	126.0434	45.9371	9.7005	0.0000	0.0000	0.0000	0.0000	44.3014	141.4971	248.2721 (98a)
Space heating requirement - total per year (kWh/year)												1031.0979
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	242.8235	172.5227	126.0434	45.9371	9.7005	0.0000	0.0000	0.0000	0.0000	44.3014	141.4971	248.2721 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1031.0979
Space heating per m2										(98c) / (4) =		14.5718 (99)
9b. Energy requirements												
Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (301)
Fraction of space heat from community system												1.0000 (302)
Fraction of heat from community Heat pump-Space and Water												1.0000 (303a)
Factor for control and charging method (Table 4c(3)) for space heating												1.0000 (305)
Factor for charging method (Table 4c(3)) for water heating												1.0000 (305a)
Distribution loss factor (Table 12c) for community heating system												1.5000 (306)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating:												
Space heating requirement												
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50	242.8235	172.5227	126.0434	45.9371	9.7005	0.0000	0.0000	0.0000	0.0000	44.3014	141.4971	248.2721 (98)
307a	364.2353	258.7841	189.0651	68.9057	14.5508	0.0000	0.0000	0.0000	0.0000	66.4521	212.2456	372.4082
Space heating requirement	364.2353	258.7841	189.0651	68.9057	14.5508	0.0000	0.0000	0.0000	0.0000	66.4521	212.2456	372.4082 (307)
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)												0.0000 (308)
Space heating fuel for secondary/supplementary system	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (309)
Water heating												
Annual water heating requirement												
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50	238.8602	211.3615	224.8903	202.8916	197.4739	175.2575	168.4413	181.4468	181.4438	203.8941	216.3634	238.3005 (64)
310a	358.2903	317.0422	337.3355	304.3374	296.2109	262.8862	252.6619	272.1702	272.1657	305.8411	324.5451	357.4507
Water heating fuel	358.2903	317.0422	337.3355	304.3374	296.2109	262.8862	252.6619	272.1702	272.1657	305.8411	324.5451	357.4507 (310)
Cooling System Energy Efficiency Ratio												0.0000 (314)
Space coolin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (315)
Pumps and Fa	15.6536	14.1387	15.6536	15.1486	15.6536	15.1486	15.6536	15.6536	15.1486	15.6536	15.1486	15.6536 (331)
Lighting	21.6270	17.3500	15.6218	11.4452	8.8406	7.2228	8.0647	10.4828	13.6161	17.8650	20.1785	22.2281 (332)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333a)m	-3.7285	-6.6205	-12.2174	-17.1999	-21.5069	-21.2134	-20.7690	-17.8698	-13.4310	-8.6334	-4.4775	-3.0437 (333a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(334a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (334a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(335a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (335a)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (333b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(334b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (334b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(335b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (335b)
Annual totals kWh/year												
Space heating fuel - community heating												1546.6469 (307)
Space heating fuel - secondary												0.0000 (309)
Water heating fuel - community heating												3660.9372 (310)
Efficiency of water heater												0.0000 (311)
Electricity used for heat distribution												15.4665 (313)
Space cooling fuel												0.0000 (321)

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Electricity for pumps and fans:	
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)	
mechanical ventilation fans (SFP = 0.7625)	184.3086 (330a)
Total electricity for the above, kWh/year	184.3086 (331)
Electricity for lighting (calculated in Appendix L)	174.5427 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-150.7110 (333)
Wind generation	0.0000 (334)
Hydro-electric generation (Appendix N)	0.0000 (335a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (335)
Appendix Q - special features	
Energy saved or generated	-0.0000 (336)
Energy used	0.0000 (337)
Total delivered energy for all uses	5415.7243 (338)

12b. Carbon dioxide emissions - Community heating scheme

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Efficiency of heat source Heat pump			232.0000 (367)
Space and Water heating from Heat pump	2244.6483	0.1573	104.8561 (367)
Electrical energy for heat distribution (space & water)	15.4665	0.0000	7.5877 (372)
Overall CO2 factor for heat network			0.0643 (386)
Total CO2 associated with community systems			334.6441 (373)
Space and water heating			334.6441 (376)
Pumps, fans and electric keep-hot	184.3086	0.1387	25.5659 (378)
Energy for lighting	174.5427	0.1443	25.1919 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-150.7110	0.1305	-19.6721
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-19.6721 (380)
Total CO2, kg/year			365.7298 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.1700 (384)

13b. Primary energy - Community heating scheme

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Efficiency of heat source Heat pump			232.0000 (467a)
Space and Water heating from Heat pump	2244.6483	1.5823	1054.8406 (467)
Electrical energy for heat distribution (space & water)	15.4665	0.0000	80.1430 (472)
Overall CO2 factor for heat network			0.6787 (486)
Total CO2 associated with community systems			3534.5815 (473)
Space and water heating			3534.5815 (476)
Pumps, fans and electric keep-hot	184.3086	1.5128	278.8220 (478)
Energy for lighting	174.5427	1.5338	267.7194 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-150.7110	1.4822	-223.3800
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-223.3800 (480)
Total Primary energy kWh/year			3857.7429 (483)
Dwelling Primary energy Rate (DPER)			54.5200 (484)

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

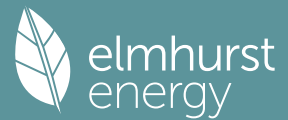
1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	70.7600 (1b)	x 2.8000 (2b)	= 198.1280 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.7600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 198.1280 (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) = 0.1514 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.4014 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)

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Infiltration rate adjusted to include shelter factor

(21) = (18) x (20) = 0.3412 (21)

Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.4350	0.4265	0.4180	0.3753	0.3668	0.3241	0.3241	0.3156	0.3412	0.3668	0.3839	0.4009 (22b)
Effective ac	0.5946	0.5910	0.5874	0.5704	0.5673	0.5525	0.5525	0.5498	0.5582	0.5673	0.5737	0.5804 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Main dwelling							
TER Opaque door			2.4200	1.0000	2.4200		(26)
TER Opening Type			13.4500	1.1450	15.4008		(27)
Heatloss Floor 1			70.7600	0.1300	9.1988		(28b)
External Wall 1	48.0200	13.4500	34.5700	0.1800	6.2226		(29a)
Corridor wall	14.4500	2.4200	12.0300	0.1800	2.1654		(29a)
Total net area of external elements Aum(A, m2)			133.2300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.4076		(33)
Main dwelling							
Party Wall 1			33.5700	0.0000	0.0000		(32)

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

239.1252 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	8.4900	0.0500	0.4245
E3 Sill	4.9900	0.0500	0.2495
E4 Jamb	21.6000	0.0500	1.0800
E7 Party floor between dwellings (in blocks of flats)	13.7500	0.0700	0.9625
E7 Party floor between dwellings (in blocks of flats)	5.1600	0.0700	0.3612
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680
E16 Corner (normal)	2.8000	0.0900	0.2520
E16 Corner (normal)	2.8000	0.0900	0.2520
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520
E18 Party wall between dwellings	5.6000	0.0600	0.3360
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	13.7500	0.3200	4.4000
E21 Exposed floor (inverted)	5.1600	0.3200	1.6512
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	11.9900	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	11.9900	0.1600	1.9184

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

12.1073 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 47.5149 (37)

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

(38)m	Jan 38.8781	Feb 38.6379	Mar 38.4024	Apr 37.2963	May 37.0893	Jun 36.1260	Jul 36.1260	Aug 35.9476	Sep 36.4970	Oct 37.0893	Nov 37.5080	Dec 37.9457 (38)
Heat transfer coeff	86.3930	86.1527	85.9172	84.8111	84.6042	83.6408	83.6408	83.4624	84.0119	84.6042	85.0229	85.4605 (39)
Average = Sum(39)m / 12 =												84.8102

HLP	Jan 1.2209	Feb 1.2175	Mar 1.2142	Apr 1.1986	May 1.1957	Jun 1.1820	Jul 1.1820	Aug 1.1795	Sep 1.1873	Oct 1.1957	Nov 1.2016	Dec 1.2078 (40)
HLP (average)												1.1986
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2644 (42)
Hot water usage for mixer showers												
62.1868	61.2522	59.8904	57.2848	55.3619	53.2176	51.9987	53.3502	54.8318	57.1341	59.7957	61.9485	61.9485 (42a)
Hot water usage for baths	26.8656	26.4666	25.9047	24.8687	24.0930	23.2329	22.7682	23.3262	23.9337	24.8541	25.9114	26.7747 (42b)
Hot water usage for other uses	37.8201	36.4448	35.0695	33.6942	32.3190	30.9437	30.9437	32.3190	33.6942	35.0695	36.4448	37.8201 (42c)
Average daily hot water use (litres/day)												116.6246 (43)

Daily hot water use	Jan 126.8724	Feb 124.1636	Mar 120.8646	Apr 115.8478	May 111.7739	Jun 107.3941	Jul 105.7107	Aug 108.9954	Sep 112.4597	Oct 117.0577	Nov 122.1519	Dec 126.5433 (44)
Energy conte	200.9349	176.8073	185.7644	158.5898	150.4692	132.0536	127.8479	134.9591	138.6740	158.8462	174.0277	198.1362 (45)
Energy content (annual)										Total = Sum(45)m =		1937.1103

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

30.1402	26.5211	27.8647	23.7885	22.5704	19.8080	19.1772	20.2439	20.8011	23.8269	26.1042	29.7204	(46)
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Water storage loss (or HIU loss):

Store volume												180.0000 (47)
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a) If manufacturer declared loss factor is known (kWh/day):

Temperature factor from Table 2b												1.5520 (48)
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Enter (49) or (54) in (55)												0.5400 (49)
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Total storage loss												0.8381 (55)
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25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)
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If cylinder contains dedicated solar storage	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (57)
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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)
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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)
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Total heat required for water heating calculated for each month

250.1775	221.2845	235.0071	206.2440	199.7119	179.7078	177.0906	184.2017	186.3282	208.0889	221.6819	247.3789	(62)
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WWHRS	-28.4292	-25.1430	-26.3283	-21.8009	-20.3176	-17.3859	-16.2966	-17.3298	-17.9882	-21.2061	-24.0239	-27.9027 (63a)
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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)
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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)
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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)
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Output from w/h	221.7483	196.1415	208.6788	184.4431	179.3942	162.3219	160.7940	166.8720	168.3400	186.8828	197.6580	219.4762 (64)
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12Total per year (kWh/year)												2252.7509 (64)
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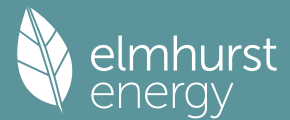
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
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Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
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Heat gains from water heating, kWh/month

106.2050	94.3702	101.1608	90.8545	89.4251	82.0312	81.9036	84.2680	84.2325	92.2105	95.9876	105.2744	(65)
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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.7296	112.6292	101.7296	105.1206	101.7296	105.1206	101.7296	101.7296	105.1206	101.7296	105.1206	101.7296 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.0643	201.1300	195.9246	184.8429	170.8542	157.7069	148.9236	146.8579	152.0634	163.1451	177.1337	190.2811 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222 (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)	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773 (71)
Water heating gains (Table 5)	142.7486	140.4319	135.9688	126.1868	120.1951	113.9322	110.0854	113.2635	116.9895	123.9388	133.3161	141.4979 (72)
Total internal gains	503.5091	514.1576	493.5895	476.1168	452.7454	433.7262	417.7052	418.8176	431.1400	448.7800	475.5369	493.4751 (73)

6. Solar gains

[Jan]	Area m2		Solar flux Table 6a W/m2		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
Northeast	7.3300		11.2829		0.6300		0.7000		0.7700		25.2754 (75)	
Southeast	6.1200		36.7938		0.6300		0.7000		0.7700		68.8174 (77)	
Solar gains	94.0928	168.6703	253.0820	350.9588	427.2200	439.1375	417.1302	357.9416	286.6154	192.4293	114.2304	79.5345 (83)
Total gains	597.6019	682.8279	746.6715	827.0756	879.9654	872.8636	834.8354	776.7592	717.7554	641.2093	589.7673	573.0096 (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	54.4042	54.5559	54.7054	55.4189	55.5544	56.1943	56.1943	56.3144	55.9461	55.5544	55.2809	54.9978
alpha	4.6269	4.6371	4.6470	4.6946	4.7036	4.7463	4.7463	4.7543	4.7297	4.7036	4.6854	4.6665
util living area	0.9900	0.9807	0.9607	0.9003	0.7756	0.5885	0.4357	0.4853	0.7275	0.9267	0.9803	0.9917 (86)
MIT	19.6823	19.8886	20.1808	20.5623	20.8377	20.9663	20.9934	20.9892	20.9104	20.5556	20.0621	19.6537 (87)
Th 2	19.9033	19.9060	19.9087	19.9211	19.9235	19.9344	19.9344	19.9364	19.9302	19.9235	19.9187	19.9138 (88)
util rest of house	0.9870	0.9749	0.9487	0.8708	0.7164	0.5006	0.3328	0.3776	0.6424	0.8981	0.9734	0.9891 (89)
MIT 2	18.3970	18.6593	19.0261	19.4932	19.7930	19.9160	19.9324	19.9327	19.8727	19.4985	18.8903	18.3682 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	18.8417	19.0846	19.4256	19.8631	20.1544	20.2793	20.2994	20.2982	20.2317	19.8642	19.2957	18.8129 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.8417	19.0846	19.4256	19.8631	20.1544	20.2793	20.2994	20.2982	20.2317	19.8642	19.2957	18.8129 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9829	0.9692	0.9421	0.8689	0.7301	0.5300	0.3685	0.4149	0.6681	0.8962	0.9681	0.9856 (94)
Useful gains	587.3768	661.7661	703.4023	718.6870	642.4232	462.5854	307.6644	322.3155	479.5246	574.6793	570.9263	564.7320 (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	1256.2993	1222.0417	1110.5304	929.7895	715.2816	475.0226	309.4224	325.3548	515.1379	783.7926	1036.9111	1248.8261 (97)
Space heating kWh	497.6784	376.5052	302.9033	151.9938	54.2066	0.0000	0.0000	0.0000	0.0000	155.5803	335.5091	508.9660 (98a)
Space heating requirement - total per year (kWh/year)												2383.3426
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	497.6784	376.5052	302.9033	151.9938	54.2066	0.0000	0.0000	0.0000	0.0000	155.5803	335.5091	508.9660 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2383.3426
Space heating per m2												(98c) / (4) = 33.6821 (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	497.6784	376.5052	302.9033	151.9938	54.2066	0.0000	0.0000	0.0000	0.0000	155.5803	335.5091	508.9660 (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)	539.1965	407.9146	328.1726	164.6737	58.7287	0.0000	0.0000	0.0000	0.0000	168.5594	363.4985	551.4258 (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

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Water heating requirement	221.7483	196.1415	208.6788	184.4431	179.3942	162.3219	160.7940	166.8720	168.3400	186.8828	197.6580	219.4762 (64)
Efficiency of water heater												79.8000 (216)
(217)m	85.8168	85.4973	84.8945	83.6292	81.7220	79.8000	79.8000	79.8000	79.8000	83.6516	85.2362	85.8817 (217)
Fuel for water heating, kWh/month	258.3974	229.4126	245.8097	220.5487	219.5177	203.4109	201.4962	209.1127	210.9524	223.4061	231.8945	255.5565 (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	21.1374	16.9572	15.2681	11.1861	8.6404	7.0593	7.8821	10.2454	13.3078	17.4606	19.7217	21.7249 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-7.8194	-12.1299	-19.1619	-23.7472	-27.6206	-26.5345	-26.2139	-23.7252	-19.7398	-14.7810	-8.9799	-6.6378 (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	-1.5994	-3.5083	-7.2534	-11.3242	-15.4101	-15.6471	-15.4630	-12.8885	-9.1855	-5.1519	-2.1768	-1.2544 (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												2582.1697 (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												2709.5154 (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)												170.5910 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-317.9537 (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												5230.3224 (238)

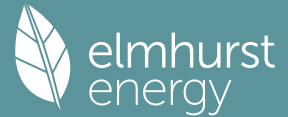
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2582.1697	0.2100	542.2556 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2709.5154	0.2100	568.9982 (264)
Space and water heating			1111.2539 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	170.5910	0.1443	24.6216 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-217.0911	0.1326	-28.7964
PV Unit electricity exported	-100.8626	0.1248	-12.5861
Total			-41.3825 (269)
Total CO2, kg/year			1106.4222 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.6400 (273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2582.1697	1.1300	2917.8517 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2709.5154	1.1300	3061.7524 (278)
Space and water heating			5979.6042 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	170.5910	1.5338	261.6581 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-217.0911	1.4901	-323.4933
PV Unit electricity exported	-100.8626	0.4580	-46.1940
Total			-369.6874 (283)
Total Primary energy kWh/year			6001.6757 (286)
Target Primary Energy Rate (TPER)			84.8200 (287)

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Plot Reference	B 103	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2
SAP Rating	82 B	DER	5.17
Environmental	96 A	TER	15.64
CO ₂ Emissions (t/year)	0.32	% DER < TER	66.94
Compliance Check	See BREL	DFEE	36.64
% DPER < TPER	35.72	TFEE	41.43
		% DFEE < TFEE	11.57
		TPER	84.82
Assessor Details	Mr. Robert Tanner	Assessor ID	W344-0001
Client			

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	70.7600 (1b)	2.8000 (2b)	198.1280 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.7600		198.1280 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	198.1280 (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) = 0.1514 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.3014 (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) = 0.2562 (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	0.3267	0.3203	0.3139	0.2818	0.2754	0.2434	0.2434	0.2370	0.2562	0.2754	0.2882	0.3010 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.5534	0.5513	0.5493	0.5397	0.5379	0.5296	0.5296	0.5281	0.5328	0.5379	0.5415	0.5453 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Windows			13.4500	1.1450	15.4008		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			70.7600	0.1000	7.0760	110.0000	7783.6000 (28b)
External Wall 1	48.0200	13.4500	34.5700	0.1500	5.1855	70.0000	2419.9000 (29a)
Corridor wall	14.4500	2.4200	12.0300	0.1900	2.2857	70.0000	842.1000 (29a)
Total net area of external elements Aum(A, m ²)			133.2300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.3680		(33)
Main dwelling							
Party Wall 1			33.5700	0.0000	0.0000	70.0000	2349.9000 (32)
Party Ceiling 1			70.7600			30.0000	2122.8000 (32b)
Internal Wall 1			155.8000			9.0000	1402.2000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	16920.5000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							239.1252 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					8.4900	0.0500	0.4245
E3 Sill					4.9900	0.0400	0.1996

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Solar gains	52.2738	93.7057	140.6011	194.9771	237.3444	243.9653	231.7390	198.8565	159.2308	106.9051	63.4613	44.1858 (83)
Total gains	453.7157	507.0134	536.1452	580.3828	603.3413	597.6549	571.6260	538.7790	508.9617	466.9074	443.8823	436.7699 (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	62.6417	62.7550	62.8664	63.3953	63.4952	63.9645	63.9645	64.0522	63.7829	63.4952	63.2934	63.0837
alpha	5.1761	5.1837	5.1911	5.2264	5.2330	5.2643	5.2643	5.2701	5.2522	5.2330	5.2196	5.2056
util living area	0.9967	0.9935	0.9868	0.9612	0.8895	0.7258	0.5530	0.6055	0.8396	0.9699	0.9930	0.9973 (86)
MIT	19.7220	19.8791	20.1136	20.4573	20.7571	20.9415	20.9885	20.9818	20.8701	20.4928	20.0542	19.6957 (87)
Th 2	20.0333	20.0349	20.0364	20.0437	20.0451	20.0514	20.0514	20.0526	20.0490	20.0451	20.0423	20.0394 (88)
util rest of house	0.9956	0.9914	0.9823	0.9472	0.8493	0.6410	0.4402	0.4911	0.7714	0.9563	0.9904	0.9964 (89)
MIT 2	18.8703	19.0277	19.2613	19.6014	19.8765	20.0234	20.0483	20.0471	19.9757	19.6408	19.2084	18.8489 (90)
Living area fraction	19.1649	19.3222	19.5561	19.8975	20.1812	20.3410	20.3735	20.3705	20.2851	19.9355	19.5010	19.1419 (92)
MIT	19.1649	19.3222	19.5561	19.8975	20.1812	20.3410	20.3735	20.3705	20.2851	19.9355	19.5010	19.1419 (93)
Temperature adjustment												0.0000
adjusted MIT	19.1649	19.3222	19.5561	19.8975	20.1812	20.3410	20.3735	20.3705	20.2851	19.9355	19.5010	19.1419 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9943	0.9894	0.9794	0.9446	0.8558	0.6684	0.4795	0.5308	0.7904	0.9544	0.9884	0.9953 (94)
Useful gains	451.1468	501.6288	525.1011	548.2063	516.3224	399.5015	274.0792	285.9982	402.2626	445.5954	438.7305	434.7283 (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	1115.3481	1080.1776	976.1269	815.3575	627.8073	421.8508	277.2808	291.3520	455.7795	691.0487	920.8913	1113.2658 (97)
Space heating kWh	494.1658	388.7848	335.5632	192.3489	82.9448	0.0000	0.0000	0.0000	0.0000	182.6173	347.1558	504.8319 (98a)
Space heating requirement - total per year (kWh/year)												2528.4126
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	494.1658	388.7848	335.5632	192.3489	82.9448	0.0000	0.0000	0.0000	0.0000	182.6173	347.1558	504.8319 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2528.4126
Space heating per m2												35.7322 (99)

8c. Space cooling requirement

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	690.7155	543.7548	557.6864	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8203	0.8959	0.8662	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	566.5916	487.1483	483.0659	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	659.4739	631.1625	594.6303	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	66.8753	107.1466	83.0040	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fC = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	16.7188	26.7867	20.7510	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												64.2565 (107)
Energy for space heating												35.7322 (99)
Energy for space cooling												0.9081 (108)
Total												36.6403 (109)
Fabric Energy Efficiency (DFEE)												36.6 (109)

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

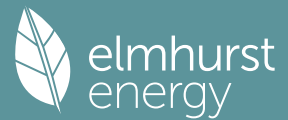
1. Overall dwelling characteristics

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	70.7600 (1b)	x 2.8000 (2b)	= 198.1280 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	70.7600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	198.1280 (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)

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Number of intermittent extract fans	3 * 10 =	30.0000 (7a)
Number of passive vents	0 * 10 =	0.0000 (7b)
Number of flueless gas fires	0 * 40 =	0.0000 (7c)
Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1514 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.4014	(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) =	0.3412 (21)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000	(22)
Wind factor	Jan 1.2750 Feb 1.2500 Mar 1.2250 Apr 1.1000 May 1.0750 Jun 0.9500 Jul 0.9500 Aug 0.9250 Sep 1.0000 Oct 1.0750 Nov 1.1250 Dec 1.1750	(22a)
Adj infilt rate	0.4350 0.4265 0.4180 0.3753 0.3668 0.3241 0.3241 0.3156 0.3412 0.3668 0.3839 0.4009	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)		0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =		0.0000 (23c)
Effective ac	0.5946 0.5910 0.5874 0.5704 0.5673 0.5525 0.5525 0.5498 0.5582 0.5673 0.5737 0.5804	(25)

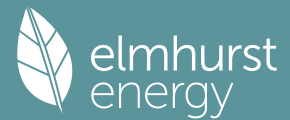
3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Main dwelling							
TER Opaque door			2.4200	1.0000	2.4200		(26)
TER Opening Type			13.4500	1.1450	15.4008		(27)
Heatloss Floor 1			70.7600	0.1300	9.1988		(28b)
External Wall 1	48.0200	13.4500	34.5700	0.1800	6.2226		(29a)
Corridor wall	14.4500	2.4200	12.0300	0.1800	2.1654		(29a)
Total net area of external elements Aum(A, m2)			133.2300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	35.4076	(33)
Main dwelling							
Party Wall 1			33.5700	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							239.1252 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				8.4900	0.0500	0.4245	
E3 Sill				4.9900	0.0500	0.2495	
E4 Jamb				21.6000	0.0500	1.0800	
E7 Party floor between dwellings (in blocks of flats)				13.7500	0.0700	0.9625	
E7 Party floor between dwellings (in blocks of flats)				5.1600	0.0700	0.3612	
E9 Balcony between dwellings, wall insulation continuous				3.4000	0.0200	0.0680	
E9 Balcony between dwellings, wall insulation continuous				3.4000	0.0200	0.0680	
E16 Corner (normal)				2.8000	0.0900	0.2520	
E16 Corner (normal)				2.8000	0.0900	0.2520	
E17 Corner (inverted - internal area greater than external area)				2.8000	-0.0900	-0.2520	
E18 Party wall between dwellings				5.6000	0.0600	0.3360	
E18 Party wall between dwellings				2.8000	0.0600	0.1680	
E20 Exposed floor (normal)				13.7500	0.3200	4.4000	
E21 Exposed floor (inverted)				5.1600	0.3200	1.6512	
E25 Staggered party wall between dwellings				2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				11.9900	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)				11.9900	0.1600	1.9184	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							12.1073 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	47.5149 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)							
(38)m	Jan 38.8781 Feb 38.6379 Mar 38.4024 Apr 37.2963 May 37.0893 Jun 36.1260 Jul 36.1260 Aug 35.9476 Sep 36.4970 Oct 37.0893 Nov 37.5080 Dec 37.9457	(38)					
Heat transfer coeff	86.3930 86.1527 85.9172 84.8111 84.6042 83.6408 83.6408 83.4624 84.0119 84.6042 85.0229 85.4605	(39)					
Average = Sum(39)m / 12 =							84.8102
HLP	Jan 1.2209 Feb 1.2175 Mar 1.2142 Apr 1.1986 May 1.1957 Jun 1.1820 Jul 1.1820 Aug 1.1795 Sep 1.1873 Oct 1.1957 Nov 1.2016 Dec 1.2078	(40)					
HLP (average)							1.1986
Days in mont	31 28 31 30 31 30 31 31 30 31 30 31						

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.2644 (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												
26.8656 26.4666 25.9047 24.8687 24.0930 23.2329 22.7682 23.3262 23.9337 24.8541 25.9114 26.7747												(42b)
Hot water usage for other uses												
37.8201 36.4448 35.0695 33.6942 32.3190 30.9437 30.9437 32.3190 33.6942 35.0695 36.4448 37.8201												(42c)
Average daily hot water use (litres/day)												59.2905 (43)
Daily hot water use	Jan 64.6856 Feb 62.9114 Mar 60.9742 Apr 58.5630 May 56.4120 Jun 54.1765 Jul 53.7119 Aug 55.6451 Sep 57.6279 Oct 59.9236 Nov 62.3562 Dec 64.5948	(44)										
Energy conte	102.4462 89.5849 93.7151 80.1698 75.9414 66.6164 64.9599 68.9003 71.0610 81.3157 88.8378 101.1399	(45)										
Energy content (annual)												984.6884
Distribution loss (46)m = 0.15 x (45)m												
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000												(46)
Water storage loss (or HIU loss):												
Total storage loss	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	(56)										
If cylinder contains dedicated solar storage												
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000												(57)
Primary loss	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	(61)										
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												
87.0793 76.1472 79.6579 68.1443 64.5502 56.6239 55.2159 58.5653 60.4018 69.1184 75.5121 85.9689												(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)										

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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	87.0793	76.1472	79.6579	68.1443	64.5502	56.6239	55.2159	58.5653	60.4018	69.1184	75.5121	85.9689 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											836.9851 (64)
Electric shower(s)	49.8012	44.3733	48.4540	46.2390	47.1067	44.9352	46.4330	47.1067	46.2390	48.4540	47.5428	49.8012 (64a)
Heat gains from water heating, kWh/month	34.2201	30.1301	32.0280	28.5958	27.9142	25.3898	25.4122	26.4180	26.6602	29.3931	30.7637	33.9425 (65)

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	113.2217	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	101.7296	112.6292	101.7296	105.1206	101.7296	105.1206	101.7296	101.7296	105.1206	101.7296	105.1206	101.7296	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	199.0643	201.1300	195.9246	184.8429	170.8542	157.7069	148.9236	146.8579	152.0634	163.1451	177.1337	190.2811	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	34.3222	(69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	-90.5773	(71)
Water heating gains (Table 5)	45.9948	44.8365	43.0483	39.7164	37.5191	35.2636	34.1562	35.5080	37.0281	39.5068	42.7274	45.6217	(72)
Total internal gains	403.7552	415.5622	397.6690	386.6464	367.0694	355.0576	341.7760	341.0621	351.1785	361.3480	381.9482	394.5989	(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					7.3300	11.2829		0.6300	0.7000	0.7700		25.2754 (75)
Southeast					6.1200	36.7938		0.6300	0.7000	0.7700		68.8174 (77)
Solar gains	94.0928	168.6703	253.0820	350.9588	427.2200	439.1375	417.1302	357.9416	286.6154	192.4293	114.2304	79.5345 (83)
Total gains	497.8481	584.2325	650.7510	737.6052	794.2895	794.1950	758.9062	699.0038	637.7939	553.7773	496.1786	474.1334 (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	54.4042	54.5559	54.7054	55.4189	55.5544	56.1943	56.1943	56.3144	55.9461	55.5544	55.2809	54.9978
alpha	4.6269	4.6371	4.6470	4.6946	4.7036	4.7463	4.7463	4.7543	4.7297	4.7036	4.6854	4.6665
util living area	0.9952	0.9894	0.9760	0.9296	0.8208	0.6363	0.4768	0.5344	0.7839	0.9548	0.9900	0.9962 (86)
MIT	19.5334	19.7467	20.0534	20.4706	20.7902	20.9533	20.9903	20.9838	20.8758	20.4538	19.9269	19.5048 (87)
Th 2	19.9033	19.9060	19.9087	19.9211	19.9235	19.9344	19.9344	19.9364	19.9302	19.9235	19.9187	19.9138 (88)
util rest of house	0.9937	0.9861	0.9681	0.9063	0.7660	0.5452	0.3655	0.4182	0.7024	0.9349	0.9862	0.9950 (89)
MIT 2	18.5822	18.7957	19.0994	19.5073	19.7877	19.9139	19.9320	19.9320	19.8650	19.5018	18.9856	18.5618 (90)
Living area fraction	fLA = Living area / (4) = 0.3460 (91)											
MIT	18.9113	19.1247	19.4295	19.8405	20.1345	20.2735	20.2981	20.2959	20.2147	19.8312	19.3113	18.8880 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.9113	19.1247	19.4295	19.8405	20.1345	20.2735	20.2981	20.2959	20.2147	19.8312	19.3113	18.8880 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	493.7555	574.2287	627.1411	666.9917	617.7979	457.0533	306.7127	320.5316	463.1545	516.5654	487.9077	470.9820	(94)
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	1262.3137	1225.4973	1110.8654	927.8789	713.5939	474.5361	309.3159	325.1597	513.7084	780.9962	1038.2377	1255.2461	(97)
Space heating kWh	571.8073	437.6525	359.8909	187.8388	71.2722	0.0000	0.0000	0.0000	0.0000	196.7365	396.2376	583.4924	(98a)
Space heating requirement - total per year (kWh/year)												2804.9282	
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	571.8073	437.6525	359.8909	187.8388	71.2722	0.0000	0.0000	0.0000	0.0000	196.7365	396.2376	583.4924	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2804.9282	
Space heating per m2												39.6400 (99)	

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	786.2238	618.9421	634.3144	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8726	0.9280	0.9002	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	686.0219	574.3757	570.9943	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	888.9652	849.7426	781.7136	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	146.1192	204.8730	156.7752	0.0000	0.0000	0.0000	0.0000	(104)

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Cooled fraction	fC = cooled area / (4) =										1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	36.5298	51.2182	39.1938	0.0000	0.0000	0.0000 (107)
Space cooling requirement											126.9418 (107)
Energy for space heating											39.6400 (99)
Energy for space cooling											1.7940 (108)
Total											41.4340 (109)
Fabric Energy Efficiency (TFEE)											41.4 (109)