

Summary for Input Data



Plot Reference	B 106	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	5.93	TER	17.60
Environmental	96 A	% DER < TER			66.31
CO ₂ Emissions (t/year)	0.32	DFEE	41.79	TFEE	46.63
Compliance Check	See BREL	% DFEE < TFEE			10.38
% DPER < TPER	34.93	DPER	62.45	TPER	95.97

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

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

Orientation	Northeast	
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	244.25	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:	25.58 m	61.68 m ²	2.80 m

8.0 Living Area	32.15	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	43.93	29.47	0.00	None	14.46	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	27.69	25.27	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	18.90	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	141.71

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	61.68

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	61.68

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 East	2.42	
NW windows	Windows	External Wall 1	North West	8.34	
SW windows	Windows	External Wall 1	South West	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	9.16	0.05	0.05	No
E3 Sill	Independently assessed	5.67	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	12.29	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	9.89	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	5.60	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
E20 Exposed floor (normal)	Independently assessed	12.29	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	9.89	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	6.75	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	6.75	0.08	0.08	No

Y-value 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	1
Manufacturer SFP	0.63
Duct Type	Rigid
MVHR Efficiency	90.00
Wet Rooms	1
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
Number of passive vents	0
Number of flueless gas fires	0

Summary for Input Data

21.0 Fixed Cooling System		No	
22.0 Pressure Testing		Yes	
Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa	
Test Method	Blower Door		
22.0 Lighting		No	
No Fixed Lighting	No		
	Name	Efficacy	Power
	Lighting 1	75.00	15.00
			Capacity
			1125.00
			Count
			7
24.0 Main Heating 1		None	
25.0 Main Heating 2		None	
26.0 Heat Networks		Space and Water Combined	
Space Community Heating			
Distribution Loss	Calculated		
Distribution Loss Value	1.50		
SAP Code	2306		
	Heat Source	Fuel Type	Heating Use
	Heat source 1	Heat pump	Electricity
	Heat source 2	None	Space and Water
	Heat source 3	None	
	Heat source 4	None	
	Heat source 5	None	
			Efficiency
			232.00
			Percentage Of Heat
			100.00
			Heat
			Heat Power Ratio
			Electrical
			Fuel Factor
			Efficiency type
27.0 Secondary Heating		None	
28.0 Water Heating		Community Heating	
Water Heating	Community Heating		
SAP Code	901		
Flue Gas Heat Recovery System	No		
Waste Water Heat Recovery Instantaneous System 1	No		
Waste Water Heat Recovery Instantaneous System 2	No		
Waste Water Heat Recovery Storage System	No		
Solar Panel	No		
Water use <= 125 litres/person/day	Yes		
Cold Water Source	From header tank		
Bath Count	1		
28.1 Showers			
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]
Shower	Combi boiler or unvented hot water system	8.00	
			Connected
			No
			Connected To
28.3 Waste Water Heat Recovery System			
29.0 Hot Water Cylinder		Internal Store	
Insulation Type	Measured Loss		
Cylinder Volume	180.00		
Loss	1.20		
			L
			kWh/day
32.0 Photovoltaic Unit		Multiple Dwellings – Not Connected	
Export Capable Meter?	No		
Connected To Dwelling	Yes		
Diverter	No		
Battery Capacity [kWh]	0.00		
PV Cells kWp	Orientation	Elevation	Overshading FGHRs
			MCS Certificate
			Overshading Factor
			MCS Certificate
			Panel Manufacturer

Summary for Input Data



0.30		South West	Horizontal	Modest	No		0.80		Reference		
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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Compliance Check	See BREL	DFEE	41.79
% DPER < TPER	34.93	TFEE	46.63
		% DFEE < TFEE	10.38
		TPER	95.97
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	61.6800 (1b)	2.8000 (2b)	172.7040 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.6800		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	172.7040 (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) =												81.0000 (23c)
Effective ac	0.2576	0.2544	0.2512	0.2352	0.2321	0.2161	0.2161	0.2129	0.2225	0.2321	0.2384	0.2448 (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			14.4600	1.1450	16.5573		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			61.6800	0.1000	6.1680	110.0000	6784.8000 (28b)
External Wall 1	43.9300	14.4600	29.4700	0.1500	4.4205	70.0000	2062.9000 (29a)
Corridor wall	27.6900	2.4200	25.2700	0.1900	4.8013	70.0000	1768.9000 (29a)
Total net area of external elements Aum(A, m ²)			133.3000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.3671		(33)
Main dwelling							
Party Wall 1			18.9000	0.0000	0.0000	70.0000	1323.0000 (32)
Party Ceiling 1			61.6800			30.0000	1850.4000 (32b)
Internal Wall 1			141.7100			9.0000	1275.3901 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		15065.3901 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							244.2508 (35)
List of Thermal Bridges							

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					m2	Table 6a W/m2	Specific data or Table 6b		Specific data or Table 6c		factor Table 6d	W	
Southwest					6.1200	36.7938	0.3500		0.7000		0.7700	38.2319 (79)	
Northwest					8.3400	11.2829	0.3500		0.7000		0.7700	15.9767 (81)	
Solar gains	54.2086	97.6441	147.6968	206.6304	253.0087	260.6650	247.3613	211.3107	167.8771	111.7182	65.8958	45.7659 (83)	
Total gains	510.4272	563.2445	595.2750	640.9487	666.8012	658.8826	629.4858	597.0396	563.7470	521.3362	499.1788	493.9334 (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	75.4003	75.6479	75.8971	77.1683	77.4277	78.7512	78.7512	79.0213	78.2164	77.4277	76.9107	76.4005	
alpha	6.0267	6.0432	6.0598	6.1446	6.1618	6.2501	6.2501	6.2681	6.2144	6.1618	6.1274	6.0934	
util living area	0.9875	0.9760	0.9512	0.8699	0.7163	0.5121	0.3710	0.4071	0.6378	0.8906	0.9719	0.9894 (86)	
MIT	20.2151	20.3668	20.5664	20.8162	20.9534	20.9950	20.9994	20.9990	20.9820	20.8176	20.4949	20.1972 (87)	
Th 2	20.1676	20.1701	20.1727	20.1852	20.1877	20.2003	20.2003	20.2028	20.1953	20.1877	20.1827	20.1777 (88)	
util rest of house	0.9839	0.9695	0.9380	0.8394	0.6650	0.4499	0.3038	0.3371	0.5702	0.8578	0.9631	0.9864 (89)	
MIT 2	19.2662	19.4583	19.7064	20.0083	20.1510	20.1976	20.2001	20.2025	20.1841	20.0178	19.6304	19.2515 (90)	
Living area fraction									fLA = Living area / (4) =			0.5212 (91)	
MIT	19.7608	19.9318	20.1547	20.4294	20.5692	20.6132	20.6168	20.6177	20.6000	20.4347	20.0810	19.7444 (92)	
Temperature adjustment												0.0000	
adjusted MIT	19.7608	19.9318	20.1547	20.4294	20.5692	20.6132	20.6168	20.6177	20.6000	20.4347	20.0810	19.7444 (93)	
8. Space heating requirement													
Utilisation	0.9818	0.9673	0.9377	0.8491	0.6897	0.4823	0.3388	0.3736	0.6048	0.8686	0.9618	0.9845 (94)	
Useful gains	501.1512	544.8013	558.1944	544.2540	459.9016	317.7467	213.2865	223.0657	340.9408	452.8194	480.1205	486.2594 (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	858.0982	831.5584	752.8958	625.2384	479.3671	319.5431	213.4502	223.3604	347.7705	531.5470	706.3155	851.4426 (97)	
Space heating kWh	265.5685	192.7007	144.8579	58.3087	14.4823	0.0000	0.0000	0.0000	0.0000	58.5734	162.8604	271.6963 (98a)	
Space heating requirement - total per year (kWh/year)												1169.0483	
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	265.5685	192.7007	144.8579	58.3087	14.4823	0.0000	0.0000	0.0000	0.0000	58.5734	162.8604	271.6963 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												1169.0483	
Space heating per m2	(98c) / (4) =											18.9534 (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													
265.5685 192.7007 144.8579 58.3087 14.4823 0.0000 0.0000 0.0000 0.0000 58.5734 162.8604 271.6963 (98)													
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50													
307a 398.3528 289.0511 217.2868 87.4631 21.7235 0.0000 0.0000 0.0000 0.0000 87.8601 244.2906 407.5444													
Space heating requirement													
398.3528 289.0511 217.2868 87.4631 21.7235 0.0000 0.0000 0.0000 0.0000 87.8601 244.2906 407.5444 (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													
227.1886 201.0983 214.1073 193.3938 188.4340 167.5166 161.2468 173.4254 173.3091 194.4455 206.0087 226.6644 (64)													
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50													
310a 340.7828 301.6474 321.1609 290.0907 282.6511 251.2749 241.8702 260.1382 259.9636 291.6682 309.0131 339.9966													
Water heating fuel													
340.7828 301.6474 321.1609 290.0907 282.6511 251.2749 241.8702 260.1382 259.9636 291.6682 309.0131 339.9966 (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 14.0923 12.7285 14.0923 13.6377 14.0923 13.6377 14.0923 14.0923 13.6377 14.0923 13.6377 14.0923 (331)													
Lighting 18.9970 15.2401 13.7220 10.0534 7.7655 6.3445 7.0839 9.2080 11.9603 15.6925 17.7247 19.5250 (332)													
Electricity generated by PVs (Appendix M) (negative quantity)													
(333a)m -3.2926 -5.8488 -10.7987 -15.2117 -19.0311 -18.7767 -18.3841 -15.8127 -11.8783 -7.6300 -3.9548 -2.6877 (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												1753.5724 (307)	
Space heating fuel - secondary												0.0000 (309)	
Water heating fuel - community heating												3490.2577 (310)	
Efficiency of water heater												0.0000 (311)	
Electricity used for heat distribution												17.5357 (313)	
Space cooling fuel												0.0000 (321)	
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)													

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mechanical ventilation fans (SFP = 0.7875) 165.9254 (330a)
 Total electricity for the above, kWh/year 165.9254 (331)
 Electricity for lighting (calculated in Appendix L) 153.3169 (332)

Energy saving/generation technologies (Appendices M ,N and Q)
 PV generation -133.3073 (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 5429.7651 (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	2260.2716	0.1569	118.5629 (367)
Electrical energy for heat distribution (space & water)	17.5357	0.0000	7.6641 (372)
Overall CO2 factor for heat network			0.0645 (386)
Total CO2 associated with community systems			338.0117 (373)
Space and water heating			338.0117 (376)
Pumps, fans and electric keep-hot	165.9254	0.1387	23.0159 (378)
Energy for lighting	153.3169	0.1443	22.1284 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-133.3073	0.1305	-17.3991
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-17.3991 (380)
Total CO2, kg/year			365.7569 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.9300 (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	2260.2716	1.5807	1194.7820 (467)
Electrical energy for heat distribution (space & water)	17.5357	0.0000	80.7893 (472)
Overall CO2 factor for heat network			0.6795 (486)
Total CO2 associated with community systems			3563.0851 (473)
Space and water heating			3563.0851 (476)
Pumps, fans and electric keep-hot	165.9254	1.5128	251.0119 (478)
Energy for lighting	153.3169	1.5338	235.1625 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-133.3073	1.4821	-197.5795
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-197.5795 (480)
Total Primary energy kWh/year			3851.6801 (483)
Dwelling Primary energy Rate (DPER)			62.4500 (484)

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

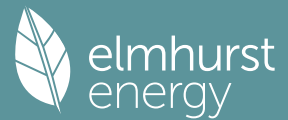
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	61.6800 (1b)	2.8000 (2b)	172.7040 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.6800		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 172.7040 (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) = 0.1158 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3658 (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) = 0.3109 (21)

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Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	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)
Adj infilt rate	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)
Effective ac	0.3964	0.3887	0.3809	0.3420	0.3343	0.2954	0.2954	0.2876	0.3109	0.3343	0.3498	0.3653	(22b)
	0.5786	0.5755	0.5725	0.5585	0.5559	0.5436	0.5436	0.5414	0.5483	0.5559	0.5612	0.5667	(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			13.0100	1.1450	14.8969			(27)
Heatloss Floor 1			61.6800	0.1300	8.0184			(28b)
External Wall 1	43.9300	13.0100	30.9200	0.1800	5.5656			(29a)
Corridor wall	27.6900	2.4200	25.2700	0.1800	4.5486			(29a)
Total net area of external elements Aum(A, m2)			133.3000					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	35.4495		(33)
Main dwelling								
Party Wall 1			18.9000	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							244.2508	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	9.1600	0.0500	0.4580	
E3 Sill	5.6700	0.0500	0.2835	
E4 Jamb	21.6000	0.0500	1.0800	
E7 Party floor between dwellings (in blocks of flats)	12.2900	0.0700	0.8603	
E7 Party floor between dwellings (in blocks of flats)	9.8900	0.0700	0.6923	
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)	5.6000	0.0900	0.5040	
E16 Corner (normal)	2.8000	0.0900	0.2520	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E20 Exposed floor (normal)	12.2900	0.3200	3.9328	
E21 Exposed floor (inverted)	9.8900	0.3200	3.1648	
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	6.7500	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)	6.7500	0.1600	1.0800	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				12.7797 (36)
Point Thermal bridges				(36a) = 0.0000
Total fabric heat loss				(33) + (36) + (36a) = 48.2292 (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	32.9748	32.8009	32.6304	31.8297	31.6799	30.9826	30.9826	30.8534	31.2512	31.6799	31.9830	32.2998	(38)
Average = Sum(39)m / 12 =	81.2040	81.0301	80.8596	80.0590	79.9092	79.2118	79.2118	79.0827	79.4804	79.9092	80.2122	80.5290	(39)
												80.0583	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.3165	1.3137	1.3110	1.2980	1.2955	1.2842	1.2842	1.2821	1.2886	1.2955	1.3005	1.3056	(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													2.0287	(42)
Hot water usage for mixer showers														
58.2345	57.3593	56.0840	53.6440	51.8434	49.8353	48.6939	49.9595	51.3469	53.5030	55.9954	58.0113	58.0113	(42a)	
Hot water usage for baths														
25.1659	24.7922	24.2659	23.2954	22.5688	21.7631	21.3278	21.8505	22.4195	23.2817	24.2721	25.0809	25.0809	(42b)	
Hot water usage for other uses														
35.4061	34.1186	32.8311	31.5436	30.2561	28.9686	28.9686	30.2561	31.5436	32.8311	34.1186	35.4061	35.4061	(42c)	
Average daily hot water use (litres/day)												109.2103	(43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use														
118.8065	116.2701	113.1810	108.4831	104.6683	100.5670	98.9904	102.0661	105.3100	109.6157	114.3860	118.4983	118.4983	(44)	
Energy content (annual)	188.1604	165.5670	173.9550	148.5079	140.9036	123.6588	119.7203	126.3792	129.8578	148.7475	162.9639	185.5396	(45)	
Distribution loss (46)m = 0.15 x (45)m														
28.2241	24.8351	26.0932	22.2762	21.1355	18.5488	17.9580	18.9569	19.4787	22.3121	24.4446	27.8309	27.8309	(46)	
Water storage loss (or HIU loss):														
Store volume												180.0000	(47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.5520	(48)	
Temperature factor from Table 2b												0.5400	(49)	
Enter (49) or (54) in (55)												0.8381	(55)	
Total storage loss														
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	(56)	
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	25.9803	(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														
237.4031	210.0443	223.1976	196.1621	190.1463	171.3130	168.9629	175.6218	177.5120	197.9902	210.6181	234.7823	234.7823	(62)	
WWHRS	-26.6224	-23.5450	-24.6550	-20.4153	-19.0263	-16.2810	-15.2608	-16.2284	-16.8449	-19.8583	-22.4971	-26.1294	(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														
210.7807	186.4992	198.5426	175.7468	171.1199	155.0320	153.7021	159.3935	160.6670	178.1319	188.1210	208.6530	208.6530	(64)	
12Total per year (kWh/year)												2146.3899	(64)	
Electric shower(s)												2146	(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														
101.9575	90.6328	97.2342	87.5022	86.2446	79.2399	79.2011	81.4152	81.3011	88.8527	92.3089	101.0861	101.0861	(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	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	89.5765	99.1740	89.5765	92.5624	89.5765	92.5624	89.5765	89.5765	92.5624	89.5765	92.5624	89.5765	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	177.1632	179.0016	174.3689	164.5064	152.0568	140.3559	132.5390	130.7006	135.3333	145.1958	157.6454	169.3463	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	(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)	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	(71)
Water heating gains (Table 5)	137.0396	134.8703	130.6911	121.5309	115.9201	110.0554	106.4531	109.4290	112.9181	119.4256	128.2067	135.8684	(72)
Total internal gains	460.2100	469.4766	451.0672	435.0304	413.9842	396.4045	381.9994	383.1369	394.2446	410.6287	434.8453	451.2219	(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			
Southwest				5.5100	36.7938	0.6300	0.7000	0.7700	61.9582 (79)			
Northwest				7.5000	11.2829	0.6300	0.7000	0.7700	25.8616 (81)			
Solar gains	87.8198	158.1797	239.2454	334.6816	409.7794	422.1710	400.6279	342.2540	271.9251	180.9743	106.7522	74.1432 (83)
Total gains	548.0298	627.6563	690.3126	769.7120	823.7635	818.5754	782.6272	725.3909	666.1697	591.6030	541.5974	525.3650 (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	51.5348	51.6454	51.7543	52.2719	52.3698	52.8309	52.8309	52.9172	52.6523	52.3698	52.1720	51.9667		
alpha	4.4357	4.4430	4.4503	4.4848	4.4913	4.5221	4.5221	4.5278	4.5102	4.4913	4.4781	4.4644		
util living area	0.9892	0.9795	0.9588	0.8978	0.7734	0.5902	0.4389	0.4903	0.7312	0.9259	0.9793	0.9910	(86)	
MIT	19.6023	19.8150	20.1224	20.5216	20.8173	20.9589	20.9913	20.9859	20.8942	20.5117	19.9934	19.5681	(87)	
Th 2	19.8279	19.8301	19.8323	19.8424	19.8443	19.8532	19.8532	19.8548	19.8498	19.8443	19.8405	19.8365	(88)	
util rest of house	0.9858	0.9732	0.9457	0.8663	0.7107	0.4963	0.3278	0.3738	0.6410	0.8958	0.9718	0.9881	(89)	
MIT 2	18.2400	18.5097	18.8945	19.3799	19.6999	19.8314	19.8507	19.8503	19.7834	19.3826	18.7452	18.2026	(90)	
Living area fraction									fLA = Living area / (4) =			0.5212	(91)	
MIT	18.9501	19.1901	19.5345	19.9750	20.2823	20.4191	20.4452	20.4422	20.3624	19.9711	19.3958	18.9144	(92)	
Temperature adjustment												0.0000		
adjusted MIT	18.9501	19.1901	19.5345	19.9750	20.2823	20.4191	20.4452	20.4422	20.3624	19.9711	19.3958	18.9144	(93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9824	0.9687	0.9417	0.8704	0.7361	0.5440	0.3858	0.4346	0.6837	0.8996	0.9680	0.9851	(94)
Useful gains	538.3907	608.0383	650.0776	669.9527	606.3363	445.2822	301.9638	315.2465	455.4505	532.2292	524.2767	517.5278	(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	1189.6467	1157.9254	1053.9656	886.6539	685.8039	460.9417	304.5859	319.6698	497.7369	748.8404	986.2745	1184.9348	(97)
Space heating kWh	484.5345	369.5241	300.4927	156.0249	59.1239	0.0000	0.0000	0.0000	0.0000	161.1588	332.6384	496.5509	(98a)
Space heating requirement - total per year (kWh/year)												2360.0482	
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	484.5345	369.5241	300.4927	156.0249	59.1239	0.0000	0.0000	0.0000	0.0000	161.1588	332.6384	496.5509	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2360.0482	
Space heating per m2										(98c) / (4) =		38.2628	(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)
Space heating requirement	484.5345	369.5241	300.4927	156.0249	59.1239	0.0000	0.0000	0.0000	0.0000	161.1588	332.6384	496.5509	(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)	524.9561	400.3511	325.5609	169.0410	64.0563	0.0000	0.0000	0.0000	0.0000	174.6032	360.3883	537.9749	(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	210.7807	186.4992	198.5426	175.7468	171.1199	155.0320	153.7021	159.3935	160.6670	178.1319	188.1210	208.6530	(64)	
Efficiency of water heater	85.8644	85.5632	84.9866	83.7939	81.9324	79.8000	79.8000	79.8000	79.8000	83.8359	85.3238	85.9325	(216)	
(217)m													(217)	

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Fuel for water heating, kWh/month	245.4810	217.9666	233.6164	209.7370	208.8551	194.2758	192.6092	199.7412	201.3371	212.4768	220.4791	242.8104	(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	18.6122	14.9314	13.4441	9.8497	7.6082	6.2160	6.9405	9.0215	11.7180	15.3747	17.3656	19.1295	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-5.1486	-8.0736	-12.8915	-16.1547	-18.9538	-18.2705	-18.0519	-16.2597	-13.4148	-9.9110	-5.9423	-4.3616	(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	-0.8722	-1.9228	-3.9940	-6.2641	-8.5528	-8.6932	-8.5893	-7.1449	-5.0751	-2.8308	-1.1893	-0.6833	(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												2556.9319	(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												2579.3856	(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)												150.2114	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-203.2459	(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												5169.2830	(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	2556.9319	0.2100	536.9557	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2579.3856	0.2100	541.6710	(264)
Space and water heating			1078.6267	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	150.2114	0.1443	21.6801	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-147.4342	0.1324	-19.5255	
PV Unit electricity exported	-55.8117	0.1247	-6.9576	
Total			-26.4831	(269)
Total CO2, kg/year			1085.7530	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			17.6000	(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	2556.9319	1.1300	2889.3331	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2579.3856	1.1300	2914.7058	(278)
Space and water heating			5804.0388	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	150.2114	1.5338	230.3993	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-147.4342	1.4893	-219.5786	
PV Unit electricity exported	-55.8117	0.4575	-25.5359	
Total			-245.1145	(283)
Total Primary energy kWh/year			5919.4244	(286)
Target Primary Energy Rate (TPER)			95.9700	(287)

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Plot Reference	B 106			Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	81 B	DER	5.93	TER	17.60
Environmental	96 A	% DER < TER			66.31
CO ₂ Emissions (t/year)	0.32	DFEE	41.79	TFEE	46.63
Compliance Check	See BREL	% DFEE < TFEE			10.38
% DPER < TPER	34.93	DPER	62.45	TPER	95.97
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	61.6800 (1b)	2.8000 (2b)	172.7040 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.6800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	172.7040 (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) = 0.1158 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2658 (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) = 0.2259 (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	0.2881	0.2824	0.2768	0.2485	0.2429	0.2146	0.2146	0.2090	0.2259	0.2429	0.2542	0.2655 (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	0.5415	0.5399	0.5383	0.5309	0.5295	0.5230	0.5230	0.5218	0.5255	0.5295	0.5323	0.5352 (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			14.4600	1.1450	16.5573		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			61.6800	0.1000	6.1680	110.0000	6784.8000 (28b)
External Wall 1	43.9300	14.4600	29.4700	0.1500	4.4205	70.0000	2062.9000 (29a)
Corridor wall	27.6900	2.4200	25.2700	0.1900	4.8013	70.0000	1768.9000 (29a)
Total net area of external elements Aum(A, m ²)			133.3000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.3671		(33)
Main dwelling							
Party Wall 1			18.9000	0.0000	0.0000	70.0000	1323.0000 (32)
Party Ceiling 1			61.6800			30.0000	1850.4000 (32b)
Internal Wall 1			141.7100			9.0000	1275.3901 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	15065.3901 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							244.2508 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					9.1600	0.0500	0.4580
E3 Sill					5.6700	0.0400	0.2268

elmhurst
energy

Ventilation heat loss calculated monthly (39)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	30.8608	30.7690	30.6790	30.2563	30.1772	29.8090	29.8090	29.7408	29.9508	30.1772	30.3372	30.5044 (38)
Heat transfer coeff												
	71.6833	71.5915	71.5015	71.0787	70.9996	70.6314	70.6314	70.5632	70.7732	70.9996	71.1596	71.3269 (39)
Average = Sum(39)m / 12 =												71.0783
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.1622	1.1607	1.1592	1.1524	1.1511	1.1451	1.1451	1.1440	1.1474	1.1511	1.1537	1.1564 (40)
HLP (average)												1.1524
Days in month	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy												2.0287 (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	24.6049	24.2335	23.7051	22.9138	22.2007	21.2190	20.4742	21.3849	21.8629	22.8356	23.8470	24.5854 (42b)
Hot water usage for other uses	35.4061	34.1186	32.8311	31.5436	30.2561	28.9686	28.9686	30.2561	31.5436	32.8311	34.1186	35.4061 (42c)
Average daily hot water use (litres/day)												55.0019 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	60.0110	58.3521	56.5362	54.4574	52.4568	50.1875	49.4428	51.6410	53.4065	55.6667	57.9655	59.9915 (44)
Energy content (annual)	88.3466	77.2116	80.7891	71.1350	67.5958	58.0402	54.6357	60.7824	61.9488	71.7322	78.3424	88.1019 (45)
Distribution loss (46)m = 0.15 x (45)m												858.6616
	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 (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												
	75.0946	65.6299	68.6707	60.4647	57.4565	49.3342	46.4403	51.6650	52.6565	60.9723	66.5910	74.8866 (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												
	75.0946	65.6299	68.6707	60.4647	57.4565	49.3342	46.4403	51.6650	52.6565	60.9723	66.5910	74.8866 (64)
Total per year (kWh/year)												729.8624 (64a)
Electric shower(s)												730 (64)
	46.6361	41.5531	45.3744	43.3003	44.1128	42.0793	43.4820	44.1128	43.3003	45.3744	44.5212	46.6361 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												530.4828 (64a)
Heat gains from water heating, kWh/month												
	30.4327	26.7958	28.5113	25.9412	25.3923	22.8534	22.4806	23.9445	23.9892	26.5867	27.7781	30.3807 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	89.3585	98.9326	89.3585	92.3371	89.3585	92.3371	89.3585	89.3585	92.3371	89.3585	92.3371	89.3585 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	177.1632	179.0016	174.3689	164.5064	152.0568	140.3559	132.5390	130.7006	135.3333	145.1958	157.6454	169.3463 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436 (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)	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486 (71)
Water heating gains (Table 5)	40.9041	39.8746	38.3216	36.0295	34.1295	31.7408	30.2158	32.1834	33.3183	35.7348	38.5806	40.8342 (72)
Total internal gains	360.8565	371.2395	355.4797	346.3037	328.9754	317.8645	305.5440	305.6732	314.4194	323.7198	341.9938	352.9697 (73)

[Jan				Area m ²	Solar flux Table 6a W/m ²	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Southwest				6.1200	36.7938	0.3500	0.7000	0.7700	38.2319 (79)
Northwest				8.3400	11.2829	0.3500	0.7000	0.7700	15.9767 (81)
Solar gains	54.2086	97.6441	147.6968	206.6304	253.0087	247.3613	211.3107	167.8771	45.7659 (84)
Total gains	415.0651	468.8837	503.1765	552.9341	581.9841	578.5295	552.9053	516.9839	398.7356 (84)

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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
tau	58.3794	58.4543	58.5279	58.8760	58.9416	59.2489	59.2489	59.3061	59.1301	58.9416	58.8091
alpha	4.8920	4.8970	4.9019	4.9251	4.9294	4.9499	4.9499	4.9537	4.9420	4.9294	4.9206
util living area											
	0.9963	0.9927	0.9849	0.9563	0.8792	0.7159	0.5474	0.6030	0.8368	0.9682	0.9924
											0.9970 (86)
MIT	19.6161	19.7860	20.0437	20.4138	20.7370	20.9329	20.9856	20.9772	20.8499	20.4394	19.9664
Th 2	19.9504	19.9516	19.9528	19.9583	19.9593	19.9641	19.9641	19.9650	19.9623	19.9593	19.9572
util rest of house											
	0.9951	0.9903	0.9796	0.9401	0.8345	0.6247	0.4260	0.4794	0.7636	0.9533	0.9895
MIT 2	18.6985	18.8682	19.1241	19.4873	19.7810	19.9331	19.9605	19.9585	19.8797	19.5179	19.0528
Living area fraction											
											0.5212 (91)
MIT	19.1768	19.3466	19.6034	19.9702	20.2793	20.4543	20.4948	20.4895	20.3854	19.9982	19.5290
Temperature adjustment											0.0000
adjusted MIT	19.1768	19.3466	19.6034	19.9702	20.2793	20.4543	20.4948	20.4895	20.3854	19.9982	19.5290
											19.1467 (93)

8. Space heating requirement											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Utilisation	0.9939	0.9885	0.9774	0.9403	0.8497	0.6700	0.4895	0.5440	0.7964	0.9540	0.9879
Useful gains	412.5480	463.5075	491.8246	519.9326	494.5220	387.6116	270.6615	281.2441	384.1024	415.3923	402.9636
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000
Heat loss rate W											
	1066.4164	1034.2564	936.9117	786.8576	609.1273	413.4948	275.0956	288.5686	444.8416	667.2692	884.4419
Space heating kWh											
	486.4781	383.5432	331.1448	192.1861	85.2664	0.0000	0.0000	0.0000	0.0000	187.3964	346.6644
Space heating requirement - total per year (kWh/year)											
											2510.6876
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
Solar heating contribution - total per year (kWh/year)											
											0.0000
Space heating kWh											
	486.4781	383.5432	331.1448	192.1861	85.2664	0.0000	0.0000	0.0000	0.0000	187.3964	346.6644
Space heating requirement after solar contribution - total per year (kWh/year)											
											2510.6876
Space heating per m2											
											(98c) / (4) =
											40.7051 (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
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000
Heat loss rate W											
	0.0000	0.0000	0.0000	0.0000	0.0000	663.9353	522.6725	536.2806	0.0000	0.0000	0.0000
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8187	0.8920	0.8597	0.0000	0.0000	0.0000
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	543.5376	466.2127	461.0171	0.0000	0.0000	0.0000
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	643.4944	615.3822	575.0020	0.0000	0.0000	0.0000
Space cooling kWh											
	0.0000	0.0000	0.0000	0.0000	0.0000	71.9689	110.9822	84.8048	0.0000	0.0000	0.0000
Cooled fraction											
											fc = cooled area / (4) =
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
Space cooling kWh											
	0.0000	0.0000	0.0000	0.0000	0.0000	17.9922	27.7455	21.2012	0.0000	0.0000	0.0000
Space cooling requirement											
											66.9390 (107)
Energy for space heating											40.7051 (99)
Energy for space cooling											1.0853 (108)
Total											41.7903 (109)
Fabric Energy Efficiency (DFEE)											41.8 (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											
Ground floor											
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)						61.6800					
Dwelling volume											
											(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =
											172.7040 (5)

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

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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) =

Air changes per hour
20.0000 / (5) = 0.1158 (8)

Pressure test
Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Yes
Blower Door
5.0000 (17)
0.3658 (18)
2 (19)

Shelter factor

(20) = 1 - [0.075 x (19)] = 0.8500 (20)

Infiltration rate adjusted to include shelter factor

(21) = (18) x (20) = 0.3109 (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	0.3964	0.3887	0.3809	0.3420	0.3343	0.2954	0.2954	0.2876	0.3109	0.3343	0.3498	0.3653 (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	0.5786	0.5755	0.5725	0.5585	0.5559	0.5436	0.5436	0.5414	0.5483	0.5559	0.5612	0.5667 (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			13.0100	1.1450	14.8969		(27)
Heatloss Floor 1			61.6800	0.1300	8.0184		(28b)
External Wall 1	43.9300	13.0100	30.9200	0.1800	5.5656		(29a)
Corridor wall	27.6900	2.4200	25.2700	0.1800	4.5486		(29a)
Total net area of external elements Aum(A, m2)			133.3000				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	35.4495		(33)
Main dwelling							
Party Wall 1			18.9000	0.0000	0.0000		(32)

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

244.2508 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.1600	0.0500	0.4580
E3 Sill	5.6700	0.0500	0.2835
E4 Jamb	21.6000	0.0500	1.0800
E7 Party floor between dwellings (in blocks of flats)	12.2900	0.0700	0.8603
E7 Party floor between dwellings (in blocks of flats)	9.8900	0.0700	0.6923
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)	5.6000	0.0900	0.5040
E16 Corner (normal)	2.8000	0.0900	0.2520
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	12.2900	0.3200	3.9328
E21 Exposed floor (inverted)	9.8900	0.3200	3.1648
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	6.7500	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	6.7500	0.1600	1.0800

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

12.7797 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 48.2292 (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	32.9748	32.8009	32.6304	31.8297	31.6799	30.9826	30.9826	30.8534	31.2512	31.6799	31.9830	32.2998 (38)
Average = Sum(39)m / 12 =	81.2040	81.0301	80.8596	80.0590	79.9092	79.2118	79.2118	79.0827	79.4804	79.9092	80.2122	80.5290 (39)

80.0583

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.3165	1.3137	1.3110	1.2980	1.2955	1.2842	1.2842	1.2821	1.2886	1.2955	1.3005	1.3056 (40)
HLP (average)												1.2980
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.0287 (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	25.1659	24.7922	24.2659	23.2954	22.5688	21.7631	21.3278	21.8505	22.4195	23.2817	24.2721	25.0809 (42b)
Hot water usage for other uses	35.4061	34.1186	32.8311	31.5436	30.2561	28.9686	28.9686	30.2561	31.5436	32.8311	34.1186	35.4061 (42c)
Average daily hot water use (litres/day)												55.5201 (43)
Daily hot water use	60.5720	58.9108	57.0970	54.8390	52.8249	50.7317	50.2964	52.1066	53.9631	56.1128	58.3907	60.4869 (44)
Energy conte	95.9313	83.8881	87.7559	75.0719	71.1124	62.3805	60.8292	64.5188	66.5419	76.1445	83.1882	94.7079 (45)
Energy content (annual)										Total = Sum(45)m =		922.0707
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 (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	81.5416	71.3049	74.5925	63.8111	60.4456	53.0234	51.7048	54.8410	56.5606	64.7228	70.7100	80.5017 (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	81.5416	71.3049	74.5925	63.8111	60.4456	53.0234	51.7048	54.8410	56.5606	64.7228	70.7100	80.5017 (64)

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12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											783.7601 (64)
Electric shower(s)	784 (64)											
46.6361	41.5531	45.3744	43.3003	44.1128	42.0793	43.4820	44.1128	43.3003	45.3744	44.5212	46.6361 (64a)	
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =											530.4828 (64a)	
Heat gains from water heating, kWh/month	32.0444	28.2145	29.9917	26.7778	26.1396	23.7757	23.7967	24.7384	24.9652	27.5243	28.8078	31.7845 (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	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	89.5765	99.1740	89.5765	92.5624	89.5765	92.5624	89.5765	89.5765	92.5624	89.5765	92.5624	89.5765	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	177.1632	179.0016	174.3689	164.5064	152.0568	140.3559	132.5390	130.7006	135.3333	145.1958	157.6454	169.3463	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	(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)	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	(71)
Water heating gains (Table 5)	43.0705	41.9859	40.3115	37.1915	35.1339	33.0218	31.9848	33.2506	34.6739	36.9950	40.0108	42.7210	(72)
Total internal gains	363.2409	373.5922	357.6876	347.6910	330.1979	319.3708	307.5310	306.9584	316.0003	325.1981	343.6494	355.0746	(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	
Southwest				5.5100	36.7938	0.6300	0.7000	0.7700			61.9582 (79)	
Northwest				7.5000	11.2829	0.6300	0.7000	0.7700			25.8616 (81)	
Solar gains	87.8198	158.1797	239.2454	334.6816	409.7794	422.1710	400.6279	342.2540	271.9251	180.9743	106.7522	74.1432 (83)
Total gains	451.0606	531.7719	596.9330	682.3725	739.9773	741.5418	708.1589	649.2124	587.9255	506.1724	450.4015	429.2177 (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	51.5348	51.6454	51.7543	52.2719	52.3698	52.8309	52.8309	52.9172	52.6523	52.3698	52.1720	51.9667
alpha	4.4357	4.4430	4.4503	4.4848	4.4913	4.5221	4.5221	4.5278	4.5102	4.4913	4.4781	4.4644
util living area	0.9949	0.9889	0.9750	0.9281	0.8196	0.6395	0.4818	0.5417	0.7889	0.9549	0.9896	0.9959 (86)
MIT	19.4420	19.6622	19.9852	20.4221	20.7645	20.9435	20.9874	20.9791	20.8540	20.4007	19.8476	19.4078 (87)
Th 2	19.8279	19.8301	19.8323	19.8424	19.8443	19.8532	19.8532	19.8548	19.8498	19.8443	19.8405	19.8365 (88)
util rest of house	0.9933	0.9853	0.9665	0.9033	0.7618	0.5423	0.3615	0.4160	0.7033	0.9341	0.9856	0.9946 (89)
MIT 2	18.4321	18.6519	18.9710	19.3951	19.6942	19.8291	19.8503	19.8494	19.7746	19.3860	18.8451	18.4045 (90)
Living area fraction	18.9585	19.1785	19.4996	19.9304	20.2521	20.4099	20.4430	20.4382	20.3373	19.9149	19.3676	18.9275 (91)
MIT	18.9585	19.1785	19.4996	19.9304	20.2521	20.4099	20.4430	20.4382	20.3373	19.9149	19.3676	18.9275 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9585	19.1785	19.4996	19.9304	20.2521	20.4099	20.4430	20.4382	20.3373	19.9149	19.3676	18.9275 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9916	0.9827	0.9635	0.9055	0.7839	0.5913	0.4244	0.4816	0.7426	0.9356	0.9834	0.9931	(94)
Useful gains	447.2563	522.5504	575.1421	617.9036	580.0975	438.4624	300.5581	312.6880	436.6222	473.5961	442.9200	426.2758	(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	1190.3290	1156.9888	1051.1431	883.0855	683.3912	460.2159	304.4079	319.3531	495.7409	744.3457	984.0115	1185.9906	(97)
Space heating kWh	552.8461	426.3427	354.1447	190.9310	76.8505	0.0000	0.0000	0.0000	0.0000	201.4377	389.5859	565.2278	(98a)
Space heating requirement - total per year (kWh/year)	2757.3663												
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	552.8461	426.3427	354.1447	190.9310	76.8505	0.0000	0.0000	0.0000	0.0000	201.4377	389.5859	565.2278	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2757.3663												
Space heating per m2	(98c) / (4) =											44.7044 (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	744.5910	586.1674	601.0282	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8619	0.9191	0.8884	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	641.7429	538.7277	533.9508	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	833.5677	796.3146	729.1466	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	138.1139	191.6447	145.2257	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												

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	0.0000	0.0000	0.0000	0.0000	0.0000	34.5285	47.9112	36.3064	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement													118.7461 (107)
Energy for space heating													44.7044 (99)
Energy for space cooling													1.9252 (108)
Total													46.6296 (109)
Fabric Energy Efficiency (TFEE)													46.6 (109)