

Summary for Input Data



Plot Reference	B 101	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	6.19	TER	18.55
Environmental	96 A	% DER < TER			66.63
CO ₂ Emissions (t/year)	0.29	DFEE	41.61	TFEE	47.63
Compliance Check	See BREL	% DFEE < TFEE			12.65
% DPER < TPER	35.14	DPER	65.41	TPER	100.85

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	249.96	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:	23.20 m	52.43 m ²	2.80 m

8.0 Living Area	30.62	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	41.09	30.37	0.00	None	10.72	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	23.87	21.45	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	17.22	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	103.60

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	52.43

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	52.43

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)
Window	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	Window	External Wall 1	North West	5.96	
SW windows	Window	External Wall 1	South West	4.75	

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	6.67	0.05	0.05	No
E3 Sill	Independently assessed	3.17	0.04	0.04	No
E4 Jamb	Independently assessed	15.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	11.28	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	8.53	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
E18 Party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
E20 Exposed floor (normal)	Independently assessed	11.28	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	8.53	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	6.15	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	6.15	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	m ² /(h.m ²) @ 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
			5
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 Reference
			Panel Manufacturer

Summary for Input Data



0.25

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

Full SAP Calculation Printout



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Environmental	96 A	% DER < TER	66.63
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Compliance Check	See BREL	% DFEE < TFEE	12.65
% DPER < TPER	35.14	DPER	65.41
		TPER	100.85
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	52.4300 (1b)	2.8000 (2b)	146.8040 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.4300		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	146.8040 (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)

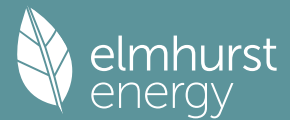
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1275 (21)

	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							
Window			10.7200	1.1450	12.2748		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			52.4300	0.1000	5.2430	110.0000	5767.3000 (28b)
External Wall 1	41.0900	10.7200	30.3700	0.1500	4.5555	70.0000	2125.9000 (29a)
Corridor wall	23.8700	2.4200	21.4500	0.1900	4.0755	70.0000	1501.5001 (29a)
Total net area of external elements Aum(A, m ²)			117.3900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	28.5688		(33)
Main dwelling							
Party Wall 1			17.2200	0.0000	0.0000	70.0000	1205.4000 (32)
Party Ceiling 1			52.4300			30.0000	1572.9000 (32b)
Internal Wall 1			103.6000			9.0000	932.4000 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		13105.4000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							249.9599 (35)
List of Thermal Bridges							

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	6.6700	0.0500	0.3335
E3 Sill	3.1700	0.0400	0.1268
E4 Jamb	15.6000	0.0400	0.6240
E7 Party floor between dwellings (in blocks of flats)	11.2800	0.0500	0.5640
E7 Party floor between dwellings (in blocks of flats)	8.5300	0.0390	0.3327
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.1000	0.3400
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0500	0.1700
E16 Corner (normal)	5.6000	0.0500	0.2800
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E20 Exposed floor (normal)	11.2800	0.1000	1.1280
E21 Exposed floor (inverted)	8.5300	0.1000	0.8530
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	6.1500	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	6.1500	0.0800	0.4920
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			5.4932 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	34.0620 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	12.4777	12.3233	12.1689	11.3968	11.2423	10.4702	10.4702	10.3158	10.7791	11.2423	11.5512	11.8600	(38)
Heat transfer coeff	46.5397	46.3853	46.2308	45.4587	45.3043	44.5322	44.5322	44.3778	44.8411	45.3043	45.6132	45.9220	(39)
Average = Sum(39)m / 12 =												45.4201	
HLP	0.8877	0.8847	0.8818	0.8670	0.8641	0.8494	0.8494	0.8464	0.8553	0.8641	0.8700	0.8759	(40)
HLP (average)												0.8663	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7618 (42)
Hot water usage for mixer showers	52.4002	51.5979	50.4156	48.5969	46.9673	44.6875	42.8844	44.9924	46.0526	48.3106	50.6621	52.3529	(42a)
Hot water usage for baths	22.7230	22.3800	21.8920	21.1612	20.5026	19.5960	18.9081	19.7492	20.1907	21.0890	22.0230	22.7050	(42b)
Hot water usage for other uses	32.6721	31.4841	30.2960	29.1079	27.9198	26.7317	26.7317	27.9198	29.1079	30.2960	31.4841	32.6721	(42c)
Average daily hot water use (litres/day)												99.0804	(43)
Daily hot water use	107.7953	105.4619	102.6036	98.8660	95.3897	91.0153	88.5243	92.6615	95.3512	99.6956	104.1691	107.7300	(44)
Energy conte	158.6933	139.5475	146.6184	129.1437	122.9193	105.2561	97.8220	109.0642	110.6026	128.4678	140.7881	158.2094	(45)
Energy content (annual)										Total = Sum(45)m =		1547.1323	
Distribution loss (46)m = 0.15 x (45)m	23.8040	20.9321	21.9928	19.3715	18.4379	15.7884	14.6733	16.3596	16.5904	19.2702	21.1182	23.7314	(46)
Water storage loss (or HIU loss):													
Store volume												110.0000	(47)
b) If manufacturer declared loss factor is not known :													
Hot water storage loss factor from Table 2 (kWh/litre/day)												0.0152	(51)
Volume factor from Table 2a												1.0294	(52)
Temperature factor from Table 2b												0.6000	(53)
Enter (49) or (54) in (55)												1.0327	(55)
Total storage loss	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144	(56)
If cylinder contains dedicated solar storage	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	213.9701	189.4749	201.8952	182.6373	178.1961	158.7498	153.0988	164.3410	164.0963	183.7446	194.2817	213.4862	(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	213.9701	189.4749	201.8952	182.6373	178.1961	158.7498	153.0988	164.3410	164.0963	183.7446	194.2817	213.4862	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2197.9721	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	96.9869	86.3415	92.9721	85.7352	85.0921	77.7926	76.7472	80.4853	79.5703	86.9370	89.6070	96.8261	(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	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	77.8224	86.1605	77.8224	80.4165	77.8224	80.4165	77.8224	77.8224	80.4165	77.8224	80.4165	77.8224	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	153.5409	155.1342	151.1192	142.5717	131.7821	121.6414	114.8667	113.2735	117.2885	125.8359	136.6256	146.7663	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	(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)	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	(71)
Water heating gains (Table 5)	130.3588	128.4843	124.9625	119.0767	114.3711	108.0453	103.1549	108.1792	110.5143	116.8508	124.4541	130.1426	(72)
Total internal gains	411.1485	419.2054	403.3304	391.4912	373.4020	359.5295	345.2704	348.7014	357.6456	369.9355	390.9225	404.1576	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
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					W/m2		or Table 6b		or Table 6c		Table 6d		
Southwest			4.7600		36.7938		0.3500		0.7000		0.7700		29.7359 (79)
Northwest			5.9600		11.2829		0.3500		0.7000		0.7700		11.4174 (81)
Solar gains	41.1533	73.8917	111.1752	154.6359	188.6164	194.0313	184.2458	157.8585	126.0624	84.3822	49.9828	34.7718 (83)	
Total gains	452.3018	493.0971	514.5056	546.1271	562.0184	553.5608	529.5162	506.5599	483.7080	454.3176	440.9053	438.9294 (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	78.2212	78.4816	78.7437	80.0812	80.3541	81.7473	81.7473	82.0317	81.1843	80.3541	79.8101	79.2733	
alpha	6.2147	6.2321	6.2496	6.3387	6.3569	6.4498	6.4498	6.4688	6.4123	6.3569	6.3207	6.2849	
util living area	0.9852	0.9731	0.9479	0.8668	0.7155	0.5114	0.3697	0.4023	0.6260	0.8793	0.9670	0.9873 (86)	
MIT	20.2879	20.4264	20.6073	20.8347	20.9586	20.9958	20.9996	20.9993	20.9858	20.8453	20.5526	20.2723 (87)	
Th 2	20.1780	20.1805	20.1830	20.1956	20.1981	20.2108	20.2108	20.2133	20.2057	20.1981	20.1931	20.1881 (88)	
util rest of house	0.9811	0.9658	0.9339	0.8357	0.6643	0.4499	0.3036	0.3339	0.5595	0.8444	0.9569	0.9838 (89)	
MIT 2	19.3645	19.5393	19.7635	20.0377	20.1658	20.2085	20.2106	20.2130	20.1970	20.0564	19.7083	19.3529 (90)	
Living area fraction	fLA = Living area / (4) = 0.5840 (91)												
MIT	19.9038	20.0574	20.2563	20.5032	20.6288	20.6683	20.6714	20.6722	20.6576	20.5172	20.2014	19.8898 (92)	
Temperature adjustment	0.0000												
adjusted MIT	19.9038	20.0574	20.2563	20.5032	20.6288	20.6683	20.6714	20.6722	20.6576	20.5172	20.2014	19.8898 (93)	
8. Space heating requirement													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9794	0.9645	0.9353	0.8483	0.6924	0.4857	0.3422	0.3739	0.5979	0.8592	0.9570	0.9822 (94)	
Useful gains	443.0004	475.6126	481.2114	463.2619	389.1298	268.8732	181.1885	189.3850	289.1909	390.3583	421.9439	431.1045 (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	726.1967	703.0788	635.9639	527.4658	404.5137	270.2357	181.3072	189.5908	294.0519	449.2902	597.5950	720.5078 (97)	
Space heating kWh	210.6980	152.8573	115.1359	46.2268	11.4457	0.0000	0.0000	0.0000	0.0000	43.8453	126.4688	215.3160 (98a)	
Space heating requirement - total per year (kWh/year)													921.9938
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	210.6980	152.8573	115.1359	46.2268	11.4457	0.0000	0.0000	0.0000	0.0000	43.8453	126.4688	215.3160 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)													921.9938
Space heating per m2	(98c) / (4) =												17.5852 (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													215.3160 (98)
307a	316.0471	229.2860	172.7038	69.3402	17.1685	0.0000	0.0000	0.0000	0.0000	65.7680	189.7032	322.9740	
Space heating requirement	316.0471	229.2860	172.7038	69.3402	17.1685	0.0000	0.0000	0.0000	0.0000	65.7680	189.7032	322.9740 (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													
	213.9701	189.4749	201.8952	182.6373	178.1961	158.7498	153.0988	164.3410	164.0963	183.7446	194.2817	213.4862 (64)	
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50	310a	320.9551	284.2123	302.8428	273.9560	267.2942	238.1247	229.6482	246.5115	246.1444	275.6169	291.4226	320.2293
Water heating fuel	320.9551	284.2123	302.8428	273.9560	267.2942	238.1247	229.6482	246.5115	246.1444	275.6169	291.4226	320.2293 (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	11.9789	10.8197	11.9789	11.5925	11.9789	11.5925	11.9789	11.9789	11.5925	11.9789	11.5925	11.9789 (331)	
Lighting	16.7181	13.4119	12.0759	8.8473	6.8339	5.5834	6.2341	8.1034	10.5255	13.8100	15.5984	17.1827 (332)	
Electricity generated by PVs (Appendix M) (negative quantity)	(333a)m	-2.7517	-4.8941	-9.0496	-12.7696	-15.9980	-15.7938	-15.4637	-13.2900	-9.9690	-6.3908	-3.3069	-2.2456 (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 (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 (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 (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 (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 (335b)	
Annual totals kWh/year													
Space heating fuel - community heating													1382.9907 (307)
Space heating fuel - secondary													0.0000 (309)
Water heating fuel - community heating													3296.9581 (310)
Efficiency of water heater													0.0000 (311)
Electricity used for heat distribution													13.8299 (313)
Space cooling fuel													0.0000 (321)
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)													
mechanical ventilation fans (SFP = 0.7875)													141.0419 (330a)

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Total electricity for the above, kWh/year	141.0419 (331)
Electricity for lighting (calculated in Appendix L)	134.9246 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-111.9226 (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	4843.9927 (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	2017.2193	0.1569	93.5523 (367)
Electrical energy for heat distribution (space & water)	13.8299	0.0000	6.8102 (372)
Overall CO2 factor for heat network			0.0642 (386)
Total CO2 associated with community systems			300.3513 (373)
Space and water heating			300.3513 (376)
Pumps, fans and electric keep-hot	141.0419	0.1387	19.5643 (378)
Energy for lighting	134.9246	0.1443	19.4738 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-111.9226	0.1305	-14.6049
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-14.6049 (380)
Total CO2, kg/year			324.7845 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.1900 (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	2017.2193	1.5810	942.4580 (467)
Electrical energy for heat distribution (space & water)	13.8299	0.0000	71.9904 (472)
Overall CO2 factor for heat network			0.6784 (486)
Total CO2 associated with community systems			3175.0237 (473)
Space and water heating			3175.0237 (476)
Pumps, fans and electric keep-hot	141.0419	1.5128	213.3682 (478)
Energy for lighting	134.9246	1.5338	206.9518 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-111.9226	1.4820	-165.8730
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-165.8730 (480)
Total Primary energy kWh/year			3429.4708 (483)
Dwelling Primary energy Rate (DPER)			65.4100 (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	52.4300 (1b)	x 2.8000 (2b)	= 146.8040 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.4300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	146.8040 (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) = 0.1362 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3862 (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) = 0.3283 (21)

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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												
Effective ac	0.4186	0.4104	0.4022	0.3611	0.3529	0.3119	0.3119	0.3037	0.3283	0.3529	0.3693	0.3858 (22b)
	0.5876	0.5842	0.5809	0.5652	0.5623	0.5486	0.5486	0.5461	0.5539	0.5623	0.5682	0.5744 (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			10.6900	1.1450	12.2405		(27)
Heatloss Floor 1			52.4300	0.1300	6.8159		(28b)
External Wall 1	41.0900	10.6900	30.4000	0.1800	5.4720		(29a)
Corridor wall	23.8700	2.4200	21.4500	0.1800	3.8610		(29a)
Total net area of external elements Aum(A, m2)			117.3900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	30.8094		(33)
Main dwelling							
Party Wall 1			17.2200	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							249.9599 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	6.6700	0.0500	0.3335
E3 Sill	3.1700	0.0500	0.1585
E4 Jamb	15.6000	0.0500	0.7800
E7 Party floor between dwellings (in blocks of flats)	11.2800	0.0700	0.7896
E7 Party floor between dwellings (in blocks of flats)	8.5300	0.0700	0.5971
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
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	11.2800	0.3200	3.6096
E21 Exposed floor (inverted)	8.5300	0.3200	2.7296
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	6.1500	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	6.1500	0.1600	0.9840

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

Point Thermal bridges	(36a) =	10.9579 (36)
Total fabric heat loss	(33) + (36) + (36a) =	41.7673 (37)

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

(38)m	Jan 28.4668	Feb 28.3020	Mar 28.1404	Apr 27.3817	May 27.2397	Jun 26.5789	Jul 26.5789	Aug 26.4565	Sep 26.8334	Oct 27.2397	Nov 27.5269	Dec 27.8271 (38)
Heat transfer coeff	70.2340	70.0692	69.9077	69.1489	69.0070	68.3461	68.3461	68.2237	68.6007	69.0070	69.2941	69.5944 (39)
Average = Sum(39)m / 12 =												69.1482

HLP	Jan 1.3396	Feb 1.3364	Mar 1.3334	Apr 1.3189	May 1.3162	Jun 1.3036	Jul 1.3036	Aug 1.3012	Sep 1.3084	Oct 1.3162	Nov 1.3217	Dec 1.3274 (40)
HLP (average)												1.3189
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7618 (42)
Hot water usage for mixer showers												
53.7583	52.9505	51.7732	49.5208	47.8585	46.0048	44.9511	46.1195	47.4002	49.3905	51.6914	53.5524 (42a)	
Hot water usage for baths												
23.2411	22.8959	22.4099	21.5136	20.8426	20.0985	19.6965	20.1792	20.7047	21.5009	22.4156	23.1625 (42b)	
Hot water usage for other uses												
32.6721	31.4841	30.2960	29.1079	27.9198	26.7317	26.7317	27.9198	29.1079	30.2960	31.4841	32.6721 (42c)	
Average daily hot water use (litres/day)												100.8135 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
109.6716	107.3304	104.4791	100.1423	96.6209	92.8350	91.3794	94.2185	97.2128	101.1875	105.5910	109.3870 (44)	
Energy content	173.6929	152.8371	160.5804	137.0898	130.0703	114.1515	110.5155	116.6622	119.8731	137.3104	150.4338	171.2736 (45)
Energy content (annual)										Total = Sum(45)m =		1674.4908
Distribution loss (46)m = 0.15 x (45)m												
26.0539	22.9256	24.0871	20.5635	19.5106	17.1227	16.5773	17.4993	17.9810	20.5966	22.5651	25.6910 (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 (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 (57)	
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)	
Total heat required for water heating calculated for each month												
222.9356	197.3144	209.8231	184.7440	179.3130	161.8057	159.7582	165.9049	167.5273	186.5531	198.0880	220.5163 (62)	
WWHRS	-24.5761	-21.7353	-22.7599	-18.8461	-17.5639	-15.0296	-14.0878	-14.9810	-15.5502	-18.3319	-20.7679	-24.1210 (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												
198.3595	175.5791	187.0632	165.8979	161.7491	146.7761	145.6703	150.9239	151.9772	168.2212	177.3201	196.3954 (64)	
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =				2025.9329 (64)
Electric shower(s)												2026 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)	
Total Energy used by instantaneous electric shower (s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
97.1470	86.4001	92.7871	83.7057	82.6425	76.0787	76.1405	78.1843	77.9812	85.0499	88.1426	96.3426 (65)	

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

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Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	77.8422	86.1824	77.8422	80.4369	77.8422	80.4369	77.8422	77.8422	80.4369	77.8422	80.4369	77.8422	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	153.5409	155.1342	151.1192	142.5717	131.7821	121.6414	114.8667	113.2735	117.2885	125.8359	136.6256	146.7663	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	(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)	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	(71)
Water heating gains (Table 5)	130.5740	128.5716	124.7139	116.2580	111.0787	105.6649	102.3394	105.0864	108.3072	114.3143	122.4203	129.4928	(72)
Total internal gains	414.3834	422.3146	406.1016	391.6929	373.1293	357.1695	344.4747	345.6284	355.4589	370.4187	391.9090	406.5276	(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				4.7500	36.7938	0.6300	0.7000		0.7700		53.4122 (79)	
Northwest				5.9400	11.2829	0.6300	0.7000		0.7700		20.4824 (81)	
Solar gains	73.8946	132.6732	199.6004	277.6045	338.5875	348.3001	330.7375	283.3823	226.3204	151.5046	89.7476	62.4367 (83)
Total gains	488.2780	554.9878	605.7020	669.2975	711.7167	705.4696	675.2122	629.0107	581.7793	521.9234	481.6567	468.9642 (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	51.8323	51.9542	52.0742	52.6456	52.7539	53.2640	53.2640	53.3596	53.0664	52.7539	52.5353	52.3087		
alpha	4.4555	4.4636	4.4716	4.5097	4.5169	4.5509	4.5509	4.5573	4.5378	4.5169	4.5024	4.4872		
util living area	0.9881	0.9781	0.9572	0.8967	0.7740	0.5912	0.4391	0.4882	0.7263	0.9218	0.9774	0.9900	(86)	
MIT	19.6353	19.8425	20.1415	20.5307	20.8196	20.9596	20.9915	20.9866	20.8990	20.5305	20.0236	19.6037	(87)	
Th 2	19.8100	19.8124	19.8148	19.8261	19.8282	19.8380	19.8380	19.8399	19.8342	19.8282	19.8239	19.8195	(88)	
util rest of house	0.9843	0.9713	0.9435	0.8643	0.7102	0.4958	0.3264	0.3705	0.6343	0.8898	0.9691	0.9868	(89)	
MIT 2	18.2661	18.5287	18.9024	19.3755	19.6870	19.8170	19.8357	19.8356	19.7721	19.3891	18.7682	18.2327	(90)	
Living area fraction									fLA = Living area / (4) =			0.5840	(91)	
MIT	19.0658	19.2960	19.6260	20.0502	20.3485	20.4843	20.5107	20.5078	20.4302	20.0557	19.5014	19.0334	(92)	
Temperature adjustment												0.0000		
adjusted MIT	19.0658	19.2960	19.6260	20.0502	20.3485	20.4843	20.5107	20.5078	20.4302	20.0557	19.5014	19.0334	(93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Useful gains	0.9812	0.9675	0.9409	0.8713	0.7402	0.5502	0.3923	0.4393	0.6838	0.8969	0.9662	0.9840	(94)	
Ext temp.	479.1179	536.9580	569.8784	583.1274	526.8143	388.1516	264.8888	276.3032	397.8396	468.1379	465.3629	461.4445	(95)	
Heat loss rate W	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)	
Space heating kWh	1037.0591	1008.7160	917.6099	771.0215	596.8035	402.1695	267.2824	280.2493	434.2582	652.5070	859.3439	1032.3211	(97)	
Space heating requirement - total per year (kWh/year)	415.1083	317.0214	258.7123	135.2837	52.0720	0.0000	0.0000	0.0000	0.0000	137.1706	283.6663	424.7322	(98a)	
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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98c)	
Space heating kWh	415.1083	317.0214	258.7123	135.2837	52.0720	0.0000	0.0000	0.0000	0.0000	137.1706	283.6663	424.7322	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												2023.7667		
Space heating per m2										(98c) / (4) =		38.5994	(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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Space heating efficiency (main heating system 1)	415.1083	317.0214	258.7123	135.2837	52.0720	0.0000	0.0000	0.0000	0.0000	137.1706	283.6663	424.7322	(98)	
Space heating fuel (main heating system)	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 efficiency (main heating system 2)	449.7381	343.4684	280.2950	146.5696	56.4160	0.0000	0.0000	0.0000	0.0000	148.6139	307.3307	460.1649	(211)	
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	(212)	
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	(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	198.3595	175.5791	187.0632	165.8979	161.7491	146.7761	145.6703	150.9239	151.9772	168.2212	177.3201	196.3954	(64)	
Efficiency of water heater	85.6757	85.3683	84.7872	83.6061	81.8195	79.8000	79.8000	79.8000	79.8000	83.6060	85.1079	85.7424	(216)	
Fuel for water heating, kWh/month	231.5238	205.6726	220.6265	198.4279	197.6902	183.9300	182.5443	189.1277	190.4476	201.2070	208.3475	229.0529	(219)	

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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	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	7.3041	(231)
Lighting	16.1741	12.9754	11.6829	8.5594	6.6115	5.4017	6.0313	7.8397	10.1830	13.3606	15.0908	16.6236	16.6236	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-5.8268	-9.0577	-14.3400	-17.8146	-20.7645	-19.9700	-19.7343	-17.8422	-14.8149	-11.0592	-6.6994	-4.9447	-4.9447	(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	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	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	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233b)m	-1.1521	-2.5295	-5.2326	-8.1717	-11.1194	-11.2846	-11.1464	-9.2869	-6.6175	-3.7103	-1.5671	-0.9031	-0.9031	(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	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	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	0.0000	(235d)
Annual totals kWh/year														
Space heating fuel - main system 1													2192.5967	(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													2438.5979	(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)													130.5340	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-235.5895	(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													4612.1390	(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	2192.5967	0.2100	460.4453	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2438.5979	0.2100	512.1056	(264)
Space and water heating			972.5509	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	130.5340	0.1443	18.8401	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-162.8683	0.1326	-21.5957	
PV Unit electricity exported	-72.7212	0.1248	-9.0748	
Total			-30.6705	(269)
Total CO2, kg/year			972.6497	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			18.5500	(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	2192.5967	1.1300	2477.6342	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2438.5979	1.1300	2755.6156	(278)
Space and water heating			5233.2498	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	130.5340	1.5338	200.2173	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-162.8683	1.4899	-242.6637	
PV Unit electricity exported	-72.7212	0.4580	-33.3069	
Total			-275.9705	(283)
Total Primary energy kWh/year			5287.5974	(286)
Target Primary Energy Rate (TPER)			100.8500	(287)

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Plot Reference	B 101	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2
SAP Rating	81 B	DER	6.19
Environmental	96 A	% DER < TER	66.63
CO ₂ Emissions (t/year)	0.29	DFEE	41.61
Compliance Check	See BREL	% DFEE < TFEE	12.65
% DPER < TPER	35.14	DPER	65.41
		TPER	100.85
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	52.4300 (1b)	2.8000 (2b)	146.8040 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	52.4300		146.8040 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 146.8040 (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) = 0.1362 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2862 (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) = 0.2433 (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	0.3102	0.3041	0.2980	0.2676	0.2615	0.2311	0.2311	0.2251	0.2433	0.2615	0.2737	0.2859 (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	0.5481	0.5462	0.5444	0.5358	0.5342	0.5267	0.5267	0.5253	0.5296	0.5342	0.5375	0.5409 (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							
Window			10.7200	1.1450	12.2748		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			52.4300	0.1000	5.2430	110.0000	5767.3000 (28b)
External Wall 1	41.0900	10.7200	30.3700	0.1500	4.5555	70.0000	2125.9000 (29a)
Corridor wall	23.8700	2.4200	21.4500	0.1900	4.0755	70.0000	1501.5001 (29a)
Total net area of external elements Aum(A, m ²)			117.3900				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 28.5688		(33)
Main dwelling							
Party Wall 1			17.2200	0.0000	0.0000	70.0000	1205.4000 (32)
Party Ceiling 1			52.4300			30.0000	1572.9000 (32b)
Internal Wall 1			103.6000			9.0000	932.4000 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13105.4000 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							249.9599 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					6.6700	0.0500	0.3335
E3 Sill					3.1700	0.0400	0.1268

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7. Mean internal temperature (heating season)											
Temperature during heating periods in the living area from Table 9, Th1 (C)											
Utilisation factor for gains for living area, nil,m (see Table 9a)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
tau	60.0570	60.1468	60.2351	60.6533	60.7322	61.1022	61.1022	61.1712	60.9591	60.7322	60.5728
alpha	5.0038	5.0098	5.0157	5.0436	5.0488	5.0735	5.0735	5.0781	5.0639	5.0488	5.0382
util living area	0.9964	0.9931	0.9862	0.9608	0.8909	0.7324	0.5615	0.6140	0.8433	0.9694	0.9925
MIT	19.6644	19.8235	20.0654	20.4188	20.7327	20.9313	20.9855	20.9776	20.8537	20.4589	20.0056
Th 2	19.9553	19.9567	19.9580	19.9644	19.9657	19.9713	19.9713	19.9723	19.9691	19.9657	19.9632
util rest of house	0.9951	0.9907	0.9812	0.9458	0.8483	0.6413	0.4382	0.4894	0.7707	0.9546	0.9896
MIT 2	18.7481	18.9073	19.1478	19.4963	19.7835	19.9395	19.9676	19.9659	19.8889	19.5403	19.0942
Living area fraction	fLA = Living area / (4) =										
MIT	19.2832	19.4423	19.6837	20.0350	20.3378	20.5187	20.5621	20.5568	20.4523	20.0768	19.6265
Temperature adjustment	0.0000										
adjusted MIT	19.2832	19.4423	19.6837	20.0350	20.3378	20.5187	20.5621	20.5568	20.4523	20.0768	19.6265

8. Space heating requirement											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Utilisation	0.9941	0.9893	0.9796	0.9470	0.8653	0.6921	0.5105	0.5622	0.8078	0.9565	0.9883
Useful gains	357.5841	397.1075	416.2501	435.8966	414.5912	328.6312	231.8817	240.6910	326.3060	354.3546	347.9512
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	908.2175	880.1764	796.7743	668.3193	517.7656	352.6284	236.0550	247.3761	379.3514	568.0548	752.8351
Space heating kWh	409.6712	324.6223	283.1100	167.3443	76.7618	0.0000	0.0000	0.0000	0.0000	158.9930	291.5164
Space heating requirement - total per year (kWh/year)	2130.5883										
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	409.6712	324.6223	283.1100	167.3443	76.7618	0.0000	0.0000	0.0000	0.0000	158.9930	291.5164
Space heating requirement after solar contribution - total per year (kWh/year)	2130.5883										
Space heating per m2	(98c) / (4) = 40.6368										

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	560.0398	440.8824	452.2873	0.0000	0.0000	0.0000
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8090	0.8862	0.8556	0.0000	0.0000	0.0000
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	453.0523	390.7207	386.9681	0.0000	0.0000	0.0000
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	527.0210	504.6126	475.4146	0.0000	0.0000	0.0000
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	53.2575	84.7356	65.8042	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	13.3144	21.1839	16.4510	0.0000	0.0000	0.0000
Space cooling requirement	50.9493										
Energy for space heating	40.6368										
Energy for space cooling	0.9718										
Total	41.6086										
Fabric Energy Efficiency (DFEE)	41.6										

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						52.4300	2.8000	x	=	146.8040	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)						52.4300					(4)
Dwelling volume								(3a) + (3b) + (3c) + (3d) + (3e) ... (3n)	=	146.8040	(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)

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Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											Air changes per hour	
Pressure test												20.0000 / (5) =	0.1362 (8)
Pressure Test Method												Yes	
Measured/design AP50												Blower Door	
Infiltration rate												5.0000	(17)
Number of sides sheltered												0.3862	(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) =	0.3283 (21)
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)
	0.4186	0.4104	0.4022	0.3611	0.3529	0.3119	0.3119	0.3037	0.3283	0.3529	0.3693	0.3858	(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	0.5876	0.5842	0.5809	0.5652	0.5623	0.5486	0.5486	0.5461	0.5539	0.5623	0.5682	0.5744	(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			10.6900	1.1450	12.2405		(27)
Heatloss Floor 1			52.4300	0.1300	6.8159		(28b)
External Wall 1	41.0900	10.6900	30.4000	0.1800	5.4720		(29a)
Corridor wall	23.8700	2.4200	21.4500	0.1800	3.8610		(29a)
Total net area of external elements Aum(A, m2)			117.3900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)... (30) + (32) =	30.8094		(33)
Main dwelling							
Party Wall 1			17.2200	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							249.9599 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				6.6700	0.0500	0.3335	
E3 Sill				3.1700	0.0500	0.1585	
E4 Jamb				15.6000	0.0500	0.7800	
E7 Party floor between dwellings (in blocks of flats)				11.2800	0.0700	0.7896	
E7 Party floor between dwellings (in blocks of flats)				8.5300	0.0700	0.5971	
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	
E18 Party wall between dwellings				2.8000	0.0600	0.1680	
E20 Exposed floor (normal)				11.2800	0.3200	3.6096	
E21 Exposed floor (inverted)				8.5300	0.3200	2.7296	
E25 Staggered party wall between dwellings				2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				6.1500	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)				6.1500	0.1600	0.9840	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.9579 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	41.7673 (37)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7618 (42)
Hot water usage for mixer showers												0.0000 (42a)
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42b)
Hot water usage for other uses	23.2411	22.8959	22.4099	21.5136	20.8426	20.0985	19.6965	20.1792	20.7047	21.5009	22.4156	23.1625 (42b)
Average daily hot water use (litres/day)	32.6721	31.4841	30.2960	29.1079	27.9198	26.7317	26.7317	27.9198	29.1079	30.2960	31.4841	32.6721 (42c)
												51.2501 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	55.9132	54.3800	52.7058	50.6215	48.7624	46.8302	46.4283	48.0990	49.8126	51.7969	53.8997	55.8346 (44)
Distribution loss (46)m = 0.15 x (45)m	88.5529	77.4364	81.0069	69.2984	65.6436	57.5832	56.1510	59.5566	61.4239	70.2879	76.7900	87.4236 (45)
Total storage loss	Total = Sum(45)m =											851.1543
Water storage loss (or HIU 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 (46)
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 (56)
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 (57)
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 (59)
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
WWHRS	75.2699	65.8209	68.8559	58.9036	55.7970	48.9457	47.7283	50.6231	52.2104	59.7447	65.2715	74.3100 (62)
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 (63a)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	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)
	75.2699	65.8209	68.8559	58.9036	55.7970	48.9457	47.7283	50.6231	52.2104	59.7447	65.2715	74.3100 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											723.4811 (64)
												723 (64)

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Electric shower(s)	43.0515	38.3592	41.8868	39.9721	40.7221	38.8450	40.1398	40.7221	39.9721	41.8868	41.0992	43.0515 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												489.7080 (64a)
Heat gains from water heating, kWh/month	29.5804	26.0450	27.6857	24.7189	24.1298	21.9477	21.9670	22.8363	23.0456	25.4079	26.5927	29.3404 (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	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	88.0878	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	77.8422	86.1824	77.8422	80.4369	77.8422	80.4369	77.8422	77.8422	80.4369	77.8422	80.4369	77.8422	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	153.5409	155.1342	151.1192	142.5717	131.7821	121.6414	114.8667	113.2735	117.2885	125.8359	136.6256	146.7663	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	31.8088	(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)	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	-70.4702	(71)
Water heating gains (Table 5)	39.7585	38.7575	37.2119	34.3318	32.4325	30.4829	29.5256	30.6940	32.0078	34.1504	36.9342	39.4360	(72)
Total internal gains	320.5680	329.5004	315.5996	306.7668	291.4831	281.9875	271.6608	271.2359	279.1595	287.2548	303.4230	313.4708	(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					4.7500	36.7938	0.6300	0.7000	0.7700					53.4122 (79)
Northwest					5.9400	11.2829	0.6300	0.7000	0.7700					20.4824 (81)
Solar gains	73.8946	132.6732	199.6004	277.6045	338.5875	348.3001	330.7375	283.3823	226.3204	151.5046	89.7476			62.4367 (83)
Total gains	394.4625	462.1736	515.2000	584.3713	630.0706	630.2876	602.3984	554.6183	505.4799	438.7594	393.1707			375.9074 (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	51.8323	51.9542	52.0742	52.6456	52.7539	53.2640	53.2640	53.3596	53.0664	52.7539	52.5353	52.3087	
alpha	4.4555	4.4636	4.4716	4.5097	4.5169	4.5509	4.5509	4.5573	4.5378	4.5169	4.5024	4.4872	
util living area	0.9948	0.9889	0.9755	0.9306	0.8262	0.6476	0.4884	0.5467	0.7915	0.9549	0.9894	0.9958	(86)
MIT	19.4573	19.6729	19.9887	20.4190	20.7594	20.9418	20.9870	20.9789	20.8544	20.4072	19.8615	19.4255	(87)
Th 2	19.8100	19.8124	19.8148	19.8261	19.8282	19.8380	19.8380	19.8399	19.8342	19.8282	19.8239	19.8195	(88)
util rest of house	0.9931	0.9852	0.9670	0.9061	0.7682	0.5484	0.3649	0.4183	0.7045	0.9337	0.9852	0.9944	(89)
MIT 2	18.4311	18.6464	18.9588	19.3776	19.6755	19.8135	19.8351	19.8345	19.7602	19.3774	18.8437	18.4067	(90)
Living area fraction	19.0304	19.2459	19.5603	19.9858	20.3086	20.4725	20.5079	20.5028	20.3992	19.9788	19.4381	19.0017	(91)
MIT	19.0304	19.2459	19.5603	19.9858	20.3086	20.4725	20.5079	20.5028	20.3992	19.9788	19.4381	19.0017	(92)
Temperature adjustment	19.0304	19.2459	19.5603	19.9858	20.3086	20.4725	20.5079	20.5028	20.3992	19.9788	19.4381	19.0017	(93)
adjusted MIT	19.0304	19.2459	19.5603	19.9858	20.3086	20.4725	20.5079	20.5028	20.3992	19.9788	19.4381	19.0017	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	391.1206	454.2777	497.0294	531.7219	500.1770	381.0055	263.3758	273.6247	379.0815	411.1054	386.6509	373.3067	(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	(95)
Heat loss rate W	1034.5767	1005.2051	913.0149	766.5725	594.0501	401.3614	267.0866	279.9097	432.1321	647.2016	854.9609	1030.1160	(97)
Space heating kWh	478.7314	370.2232	309.4933	169.0924	69.8416	0.0000	0.0000	0.0000	0.0000	175.6556	337.1832	488.6661	(98a)
Space heating requirement - total per year (kWh/year)												2398.8867	
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	478.7314	370.2232	309.4933	169.0924	69.8416	0.0000	0.0000	0.0000	0.0000	175.6556	337.1832	488.6661	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2398.8867	
Space heating per m ²												45.7541	(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	642.4535	505.7613	518.5004	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8575	0.9165	0.8865	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	550.9180	463.5306	459.6305	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	708.5194	677.4716	623.1184	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	113.4730	159.1721	121.6350	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	28.3683	39.7930	30.4087	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												98.5700	(107)

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Energy for space heating	45.7541 (99)
Energy for space cooling	1.8800 (108)
Total	47.6341 (109)
Fabric Energy Efficiency (TFEE)	47.6 (109)