

Summary for Input Data



Plot Reference	B 107	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	6.22	TER	18.64
Environmental	96 A	% DER < TER			66.63
CO ₂ Emissions (t/year)	0.29	DFEE	41.93	TFEE	47.22
Compliance Check	See BREL	% DFEE < TFEE			11.21
% DPER < TPER	35.48	DPER	65.66	TPER	101.78

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

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

Orientation	Southeast	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
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	250.73	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
		17.56 m	51.96 m ²	2.80 m

8.0 Living Area	28.96	m ²
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9.0 External Walls	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	41.05	28.61	0.00	None	12.44	Enter Gross Area
	Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	8.12	5.70	0.70	Stairwell Access Corridor 3	2.42	Enter Gross Area

9.1 Party Walls	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	32.93	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	116.20

10.1 Party Ceilings	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	51.96

11.0 Heat Loss Floors	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	51.96

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	South East	2.42	
NW windows	Windows	External Wall 1	North West	8.69	
NE windows	Windows	External Wall 1	North East	3.74	

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	7.81	0.05	0.05	No
E3 Sill	Independently assessed	4.32	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	11.26	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	2.90	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.40	0.10	0.10	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.40	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	5.60	0.05	0.05	No
E20 Exposed floor (normal)	Independently assessed	11.26	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	2.90	0.10	0.10	No
E25 Staggered party wall between dwellings	Independently assessed	5.60	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	11.76	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	11.76	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	
CO ₂ Emissions (t/year)	0.29	DFEE	41.93	TFEE	47.22		
Compliance Check	See BREL	% DFEE < TFEE				11.21	
% DPER < TPER	35.48	DPER	65.66	TPER	101.78		
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	51.9600 (1b)	2.8000 (2b)	145.4880 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.9600		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	145.4880 (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			12.4300	1.1450	14.2328		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			51.9600	0.1000	5.1960	110.0000	5715.6000 (28b)
External Wall 1	41.0500	12.4300	28.6200	0.1500	4.2930	70.0000	2003.3999 (29a)
Corridor wall	8.1200	2.4200	5.7000	0.1900	1.0830	70.0000	399.0000 (29a)
Total net area of external elements Aum(A, m ²)			101.1300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.2248		(33)
Main dwelling							
Party Wall 1			32.9300	0.0000	0.0000	70.0000	2305.1000 (32)
Party Ceiling 1			51.9600			30.0000	1558.8000 (32b)
Internal Wall 1			116.2000			9.0000	1045.8000 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		13027.6999 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.7256 (35)
List of Thermal Bridges							

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	7.8100	0.0500	0.3905
E3 Sill	4.3200	0.0400	0.1728
E4 Jamb	21.6000	0.0400	0.8640
E7 Party floor between dwellings (in blocks of flats)	11.2600	0.0500	0.5630
E7 Party floor between dwellings (in blocks of flats)	2.9000	0.0390	0.1131
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)	2.8000	0.0500	0.1400
E18 Party wall between dwellings	5.6000	0.0500	0.2800
E20 Exposed floor (normal)	11.2600	0.1000	1.1260
E21 Exposed floor (inverted)	2.9000	0.1000	0.2900
E25 Staggered party wall between dwellings	5.6000	0.0390	0.2184
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	11.7600	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	11.7600	0.0800	0.9408
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			5.6086 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	32.8334 (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	12.3658	12.2128	12.0598	11.2946	11.1416	10.3764	10.3764	10.2234	10.6825	11.1416	11.4476	11.7537	(38)
Heat transfer coeff	45.1993	45.0462	44.8932	44.1280	43.9750	43.2098	43.2098	43.0568	43.5159	43.9750	44.2811	44.5871	(39)
Average = Sum(39)m / 12 =												44.0898	
HLP	0.8699	0.8669	0.8640	0.8493	0.8463	0.8316	0.8316	0.8287	0.8375	0.8463	0.8522	0.8581	(40)
HLP (average)												0.8485	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7479 (42)
Hot water usage for mixer showers	52.1736	51.3748	50.1976	48.3867	46.7642	44.4943	42.6990	44.7978	45.8535	48.1017	50.4430	52.1265	(42a)
Hot water usage for baths	22.6252	22.2837	21.7978	21.0702	20.4144	19.5117	18.8268	19.6643	20.1038	20.9983	21.9283	22.6073	(42b)
Hot water usage for other uses	32.5301	31.3472	30.1643	28.9814	27.7985	26.6156	26.6156	27.7985	28.9814	30.1643	31.3472	32.5301	(42c)
Average daily hot water use (litres/day)												98.6518	(43)
Daily hot water use	107.3289	105.0057	102.1598	98.4383	94.9771	90.6216	88.1414	92.2606	94.9387	99.2643	103.7185	107.2640	(44)
Energy conte	158.0068	138.9438	145.9842	128.5850	122.3876	104.8008	97.3988	108.5924	110.1241	127.9121	140.1790	157.5250	(45)
Energy content (annual)										Total = Sum(45)m =		1540.4397	
Distribution loss (46)m = 0.15 x (45)m	23.7010	20.8416	21.8976	19.2878	18.3581	15.7201	14.6098	16.2889	16.5186	19.1868	21.0269	23.6287	(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	213.2836	188.8712	201.2610	182.0787	177.6644	158.2945	152.6756	163.8692	163.6178	183.1889	193.6727	212.8018	(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	213.2836	188.8712	201.2610	182.0787	177.6644	158.2945	152.6756	163.8692	163.6178	183.1889	193.6727	212.8018	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2191.2795	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
												0.0000	(64a)
Heat gains from water heating, kWh/month	96.7587	86.1408	92.7612	85.5495	84.9153	77.6412	76.6065	80.3284	79.4112	86.7522	89.4045	96.5985	(65)

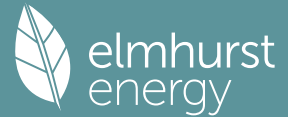
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.8290	85.0607	76.8290	79.3900	76.8290	79.3900	76.8290	76.8290	79.3900	76.8290	79.3900	76.8290	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	152.3222	153.9028	149.9197	141.4401	130.7361	120.6758	113.9550	112.3743	116.3575	124.8371	135.5411	145.6013	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	(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)	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	(71)
Water heating gains (Table 5)	130.0520	128.1857	124.6790	118.8187	114.1335	107.8350	102.9658	107.9683	110.2934	116.6024	124.1729	129.8367	(72)
Total internal gains	408.4216	416.3676	400.6461	388.8671	370.9170	357.1192	342.9682	346.3901	355.2592	367.4869	388.3223	401.4854	(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			
Northeast					3.7400	11.2829	0.3500		0.7000		0.7700		7.1646 (75)
Northwest					8.6900	11.2829	0.3500		0.7000		0.7700		16.6472 (81)
Solar gains	23.8118	48.4697	87.3269	143.4159	192.7791	205.5229	192.2625	153.2739	106.4092	59.2338	29.9614	19.4459 (83)	
Total gains	432.2334	464.8372	487.9730	532.2830	563.6961	562.6422	535.2307	499.6640	461.6684	426.7207	418.2838	420.9314 (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	80.0634	80.3354	80.6092	82.0070	82.2924	83.7496	83.7496	84.0473	83.1606	82.2924	81.7236	81.1626	
alpha	6.3376	6.3557	6.3739	6.4671	6.4862	6.5833	6.5833	6.6032	6.5440	6.4862	6.4482	6.4108	
util living area	0.9873	0.9779	0.9547	0.8674	0.6982	0.4892	0.3550	0.3959	0.6362	0.8945	0.9719	0.9890 (86)	
MIT	20.2885	20.4126	20.5981	20.8427	20.9664	20.9971	20.9997	20.9994	20.9857	20.8352	20.5452	20.2767 (87)	
Th 2	20.1932	20.1957	20.1982	20.2108	20.2134	20.2260	20.2260	20.2286	20.2210	20.2134	20.2083	20.2033 (88)	
util rest of house	0.9837	0.9718	0.9422	0.8367	0.6477	0.4311	0.2927	0.3298	0.5702	0.8623	0.9630	0.9858 (89)	
MIT 2	19.3773	19.5349	19.7659	20.0606	20.1874	20.2245	20.2259	20.2284	20.2122	20.0602	19.7123	19.3704 (90)	
Living area fraction	19.8851	20.0241	20.2297	20.4965	20.6216	20.6551	20.6572	20.6581	20.6433	fLA = Living area / (4) =	20.1765	0.5574 (91)	
MIT	19.8851	20.0241	20.2297	20.4965	20.6216	20.6551	20.6572	20.6581	20.6433	20.4922	20.1765	19.8755 (92)	
Temperature adjustment	19.8851	20.0241	20.2297	20.4965	20.6216	20.6551	20.6572	20.6581	20.6433	20.4922	20.1765	0.0000	
adjusted MIT	19.8851	20.0241	20.2297	20.4965	20.6216	20.6551	20.6572	20.6581	20.6433	20.4922	20.1765	19.8755 (93)	
8. Space heating requirement													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9820	0.9702	0.9428	0.8484	0.6744	0.4634	0.3274	0.3666	0.6065	0.8746	0.9626	0.9842 (94)	
Useful gains	424.4593	451.0012	460.0507	451.6059	380.1536	260.7322	175.2348	183.1858	279.9970	373.2118	402.6329	414.2897 (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	704.4369	681.2851	616.3723	511.7310	392.3280	261.6405	175.3108	183.3406	284.7384	435.0078	579.0418	698.9266 (97)	
Space heating kWh	208.3034	154.7508	116.3033	43.2901	9.0578	0.0000	0.0000	0.0000	0.0000	45.9762	127.0145	211.7698 (98a)	
Space heating requirement - total per year (kWh/year)												916.4658	
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	208.3034	154.7508	116.3033	43.2901	9.0578	0.0000	0.0000	0.0000	0.0000	45.9762	127.0145	211.7698 (98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												916.4658	
Space heating per m2										(98c) / (4) =		17.6379 (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													
307a	312.4551	232.1263	174.4550	64.9351	13.5866	0.0000	0.0000	0.0000	0.0000	68.9643	190.5217	317.6547	
Space heating requirement	312.4551	232.1263	174.4550	64.9351	13.5866	0.0000	0.0000	0.0000	0.0000	68.9643	190.5217	317.6547 (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													
	213.2836	188.8712	201.2610	182.0787	177.6644	158.2945	152.6756	163.8692	163.6178	183.1889	193.6727	212.8018 (64)	
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50													
310a	319.9253	283.3069	301.8915	273.1181	266.4966	237.4418	229.0134	245.8039	245.4267	274.7833	290.5091	319.2027	
Water heating fuel	319.9253	283.3069	301.8915	273.1181	266.4966	237.4418	229.0134	245.8039	245.4267	274.7833	290.5091	319.2027 (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	11.8715	10.7227	11.8715	11.4886	11.8715	11.4886	11.8715	11.8715	11.4886	11.8715	11.4886	11.8715 (331)	
Lighting	16.4434	13.1915	11.8775	8.7020	6.7217	5.4916	6.1317	7.9702	10.3526	13.5831	15.3421	16.9004 (332)	
Electricity generated by PVs (Appendix M) (negative quantity)													
(333a)m	-2.7503	-4.8906	-9.0409	-12.7538	-15.9751	-15.7700	-15.4406	-13.2717	-9.9573	-6.3853	-3.3050	-2.2446 (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												1374.6987 (307)	
Space heating fuel - secondary												0.0000 (309)	
Water heating fuel - community heating												3286.9192 (310)	
Efficiency of water heater												0.0000 (311)	
Electricity used for heat distribution												13.7470 (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)													139.7776 (330a)

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Total electricity for the above, kWh/year	139.7776 (331)
Electricity for lighting (calculated in Appendix L)	132.7079 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-111.7851 (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	4822.3183 (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	2009.3181	0.1570	93.0029 (367)
Electrical energy for heat distribution (space & water)	13.7470	0.0000	6.7832 (372)
Overall CO2 factor for heat network			0.0642 (386)
Total CO2 associated with community systems			299.1623 (373)
Space and water heating			299.1623 (376)
Pumps, fans and electric keep-hot	139.7776	0.1387	19.3889 (378)
Energy for lighting	132.7079	0.1443	19.1539 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-111.7851	0.1305	-14.5874
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-14.5874 (380)
Total CO2, kg/year			323.1176 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			6.2200 (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	2009.3181	1.5811	936.8547 (467)
Electrical energy for heat distribution (space & water)	13.7470	0.0000	71.7074 (472)
Overall CO2 factor for heat network			0.6784 (486)
Total CO2 associated with community systems			3162.5449 (473)
Space and water heating			3162.5449 (476)
Pumps, fans and electric keep-hot	139.7776	1.5128	211.4555 (478)
Energy for lighting	132.7079	1.5338	203.5518 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-111.7851	1.4820	-165.6709
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-165.6709 (480)
Total Primary energy kWh/year			3411.8814 (483)
Dwelling Primary energy Rate (DPER)			65.6600 (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	51.9600 (1b)	2.8000 (2b)	145.4880 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.9600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	145.4880 (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	Air changes per hour
Pressure test	20.0000 / (5) = 0.1375 (8)
Pressure Test Method	Yes
Measured/design AP50	Blower Door
Infiltration rate	5.0000 (17)
Number of sides sheltered	0.3875 (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) = 0.3293 (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	0.4199	0.4117	0.4035	0.3623	0.3540	0.3129	0.3129	0.3046	0.3293	0.3540	0.3705	0.3870 (22b)
	0.5882	0.5847	0.5814	0.5656	0.5627	0.5489	0.5489	0.5464	0.5542	0.5627	0.5686	0.5749 (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			10.5700	1.1450	12.1031		(27)
Heatloss Floor 1			51.9600	0.1300	6.7548		(28b)
External Wall 1	41.0500	10.5700	30.4800	0.1800	5.4864		(29a)
Corridor wall	8.1200	2.4200	5.7000	0.1800	1.0260		(29a)
Total net area of external elements Aum(A, m2)			101.1300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.7903		(33)
Main dwelling							
Party Wall 1			32.9300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.7256 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	7.8100	0.0500	0.3905
E3 Sill	4.3200	0.0500	0.2160
E4 Jamb	21.6000	0.0500	1.0800
E7 Party floor between dwellings (in blocks of flats)	11.2600	0.0700	0.7882
E7 Party floor between dwellings (in blocks of flats)	2.9000	0.0700	0.2030
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680
E16 Corner (normal)	2.8000	0.0900	0.2520
E18 Party wall between dwellings	5.6000	0.0600	0.3360
E20 Exposed floor (normal)	11.2600	0.3200	3.6032
E21 Exposed floor (inverted)	2.9000	0.3200	0.9280
E25 Staggered party wall between dwellings	5.6000	0.0600	0.3360
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	11.7600	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	11.7600	0.1600	1.8816
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			10.1505 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	37.9408 (37)

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

(38)m	Jan 28.2385	Feb 28.0741	Mar 27.9130	Apr 27.1562	May 27.0146	Jun 26.3555	Jul 26.3555	Aug 26.2335	Sep 26.6094	Oct 27.0146	Nov 27.3011	Dec 27.6005 (38)
Heat transfer coeff	66.1792	66.0148	65.8537	65.0970	64.9554	64.2963	64.2963	64.1742	64.5502	64.9554	65.2418	65.5413 (39)
Average = Sum(39)m / 12 =												65.0963
HLP	Jan 1.2737	Feb 1.2705	Mar 1.2674	Apr 1.2528	May 1.2501	Jun 1.2374	Jul 1.2374	Aug 1.2351	Sep 1.2423	Oct 1.2501	Nov 1.2556	Dec 1.2614 (40)
HLP (average)												1.2528
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7479 (42)
Hot water usage for mixer showers	53.5259	52.7215	51.5493	49.3066	47.6516	45.8059	44.7568	45.9200	47.1952	49.1770	51.4678	53.3208 (42a)
Hot water usage for baths	23.1411	22.7974	22.3135	21.4211	20.7529	20.0120	19.6118	20.0924	20.6157	21.4085	22.3192	23.0629 (42b)
Hot water usage for other uses	32.5301	31.3472	30.1643	28.9814	27.7985	26.6156	26.6156	27.7985	28.9814	30.1643	31.3472	32.5301 (42c)
Average daily hot water use (litres/day)												100.3774 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	109.1971	106.8662	104.0271	99.7092	96.2030	92.4335	90.9842	93.8109	96.7923	100.7497	105.1343	108.9138 (44)
Distribution loss (46)m = 0.15 x (45)m	172.9416	152.1760	159.8858	136.4968	129.5077	113.6577	110.0375	116.1575	119.3546	136.7164	149.7830	170.5327 (45)
Water storage loss (or HIU loss):										Total = Sum(45)m =		1667.2475
Store volume	25.9412	22.8264	23.9829	20.4745	19.4262	17.0487	16.5056	17.4236	17.9032	20.5075	22.4675	25.5799 (46)
a) If manufacturer declared loss factor is known (kWh/day):												180.0000 (47)
Temperature factor from Table 2b												1.5520 (48)
Enter (49) or (54) in (55)												0.5400 (49)
Total storage loss												0.8381 (55)
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 (56)
Primary 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 (57)
Combi loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
WWHRS	222.1843	196.6532	209.1285	184.1510	178.7504	161.3119	159.2801	165.4002	167.0088	185.9591	197.4372	219.7754 (62)
PV diverter	-24.4698	-21.6413	-22.6615	-18.7646	-17.4880	-14.9646	-14.0269	-14.9162	-15.4829	-18.2527	-20.6780	-24.0167 (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)
12Total per year (kWh/year)	197.7145	175.0120	186.4670	165.3864	161.2624	146.3473	145.2532	150.4840	151.5259	167.7065	176.7592	195.7588 (64)
Electric shower(s)								Total per year (kWh/year) = Sum(64)m =				2019.6770 (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												
	96.8972	86.1803	92.5562	83.5086	82.4555	75.9145	75.9816	78.0165	77.8088	84.8524	87.9262	96.0963 (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	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	77.2406	85.5163	77.2406	79.8153	77.2406	79.8153	77.2406	77.2406	79.8153	77.2406	79.8153	77.2406	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	152.3222	153.9028	149.9197	141.4401	130.7361	120.6758	113.9550	112.3743	116.3575	124.8371	135.5411	145.6013	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	(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)	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	(71)
Water heating gains (Table 5)	130.2382	128.2445	124.4035	115.9841	110.8272	105.4369	102.1258	104.8609	108.0677	114.0489	122.1197	129.1617	(72)
Total internal gains	412.0193	419.8820	403.7821	389.4578	371.0222	355.1463	342.5397	343.6942	353.4588	368.3449	389.6944	404.2219	(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
Northeast					3.1800	11.2829	0.6300	0.7000	0.7700			10.9653 (75)
Northwest					7.3900	11.2829	0.6300	0.7000	0.7700			25.4823 (81)
Solar gains	36.4476	74.1902	133.6671	219.5198	295.0777	314.5840	294.2869	234.6089	162.8755	90.6663	45.8605	29.7650 (83)
Total gains	448.4669	494.0722	537.4492	608.9776	666.0999	669.7303	636.8266	578.3031	516.3343	459.0112	435.5550	433.9869 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
tau	54.6819	54.8181	54.9522	55.5910	55.7122	56.2833	56.2833	56.3903	56.0619	55.7122	55.4676	55.2142		
alpha	4.6455	4.6545	4.6635	4.7061	4.7141	4.7522	4.7522	4.7594	4.7375	4.7141	4.6978	4.6809		
util living area	0.9909	0.9847	0.9688	0.9122	0.7824	0.5895	0.4390	0.5001	0.7597	0.9418	0.9832	0.9922	(86)	
MIT	19.6698	19.8391	20.1250	20.5309	20.8324	20.9662	20.9932	20.9878	20.8924	20.5082	20.0333	19.6473	(87)	
Th 2	19.8615	19.8640	19.8665	19.8780	19.8801	19.8902	19.8902	19.8920	19.8863	19.8801	19.8758	19.8712	(88)	
util rest of house	0.9880	0.9797	0.9584	0.8837	0.7210	0.4977	0.3310	0.3849	0.6723	0.9164	0.9768	0.9897	(89)	
MIT 2	18.3458	18.5619	18.9222	19.4204	19.7476	19.8724	19.8882	19.8881	19.8177	19.4076	18.8183	18.3241	(90)	
Living area fraction									fLA = Living area / (4) =			0.5574	(91)	
MIT	19.0837	19.2737	19.5926	20.0393	20.3522	20.4820	20.5041	20.5010	20.4167	20.0210	19.4955	19.0616	(92)	
Temperature adjustment												0.0000		
adjusted MIT	19.0837	19.2737	19.5926	20.0393	20.3522	20.4820	20.5041	20.5010	20.4167	20.0210	19.4955	19.0616	(93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Useful gains	0.9854	0.9764	0.9554	0.8883	0.7485	0.5478	0.3913	0.4492	0.7166	0.9201	0.9740	0.9873	(94)	
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)	
Heat loss rate W	978.3751	948.8806	862.1958	725.1350	562.0082	378.1930	251.0180	263.1804	407.7445	611.9459	808.7043	974.0469	(97)	
Space heating kWh	399.1335	313.4577	259.4571	132.6041	47.2079	0.0000	0.0000	0.0000	0.0000	141.0581	276.8128	405.9146	(98a)	
Space heating requirement - total per year (kWh/year)												1975.6459		
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	399.1335	313.4577	259.4571	132.6041	47.2079	0.0000	0.0000	0.0000	0.0000	141.0581	276.8128	405.9146	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												1975.6459		
Space heating per m2										(98c) / (4) =		38.0224	(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		
399.1335	313.4577	259.4571	132.6041	47.2079	0.0000	0.0000	0.0000	0.0000	0.0000	141.0581	276.8128	405.9146	(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)	432.4307	339.6074	281.1019	143.6664	51.1461	0.0000	0.0000	0.0000	0.0000	152.8257	299.9056	439.7775	(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	197.7145	175.0120	186.4670	165.3864	161.2624	146.3473	145.2532	150.4840	151.5259	167.7065	176.7592	195.7588	(64)	
Efficiency of water heater	85.6019	85.3511	84.8007	83.5690	81.6745	79.8000	79.8000	79.8000	79.8000	83.6743	85.0614	85.6569	(216)	
Fuel for water heating, kWh/month	230.9698	205.0494	219.8884	197.9040	197.4452	183.3927	182.0216	188.5764	189.8820	200.4277	207.8018	228.5383	(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	7.0685	(231)
Lighting	16.0491	12.8752	11.5926	8.4933	6.5604	5.3599	5.9847	7.7791	10.1043	13.2573	14.9741	16.4951	16.4951	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-4.3488	-6.8261	-10.9105	-13.6877	-16.0755	-15.5042	-15.3210	-13.7934	-11.3693	-8.3875	-5.0221	-3.6835	-3.6835	(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	-0.7232	-1.5951	-3.3140	-5.1981	-7.0964	-7.2104	-7.1219	-5.9229	-4.2069	-2.3463	-0.9857	-0.5664	-0.5664	(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													2140.4614	(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													2431.8974	(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)													129.5251	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-171.2169	(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													4616.6671	(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	2140.4614	0.2100	449.4969	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2431.8974	0.2100	510.6985	(264)
Space and water heating			960.1953	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	129.5251	0.1443	18.6945	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-124.9296	0.1324	-16.5421	
PV Unit electricity exported	-46.2873	0.1247	-5.7706	
Total			-22.3127	(269)
Total CO2, kg/year			968.5064	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			18.6400	(273)

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

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year	
Space heating - main system 1	2140.4614	1.1300	2418.7214	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2431.8974	1.1300	2748.0440	(278)
Space and water heating			5166.7654	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	129.5251	1.5338	198.6700	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-124.9296	1.4892	-186.0508	
PV Unit electricity exported	-46.2873	0.4576	-21.1792	
Total			-207.2299	(283)
Total Primary energy kWh/year			5288.3063	(286)
Target Primary Energy Rate (TPER)			101.7800	(287)

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Plot Reference	B 107	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2
SAP Rating	81 B	DER	6.22
Environmental	96 A	TER	18.64
CO ₂ Emissions (t/year)	0.29	% DER < TER	66.63
Compliance Check	See BREL	DFEE	41.93
% DPER < TPER	35.48	TFEE	47.22
		% DFEE < TFEE	11.21
		DPER	65.66
		TPER	101.78
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	51.9600	2.8000	145.4880
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.9600		
Dwelling volume			

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	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) =	0.1375 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.0000	(17)
Infiltration rate	0.2875	(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) =	0.2443 (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 infiltr rate	0.3115	0.3054	0.2993	0.2688	0.2627	0.2321	0.2321	0.2260	0.2443	0.2627	0.2749	0.2871 (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	0.5485	0.5466	0.5448	0.5361	0.5345	0.5269	0.5269	0.5255	0.5299	0.5345	0.5378	0.5412 (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			12.4300	1.1450	14.2328		(27)
Door			2.4200	1.0000	2.4200		(26)
Heatloss Floor 1			51.9600	0.1000	5.1960	110.0000	5715.6000 (28b)
External Wall 1	41.0500	12.4300	28.6200	0.1500	4.2930	70.0000	2003.3999 (29a)
Corridor wall	8.1200	2.4200	5.7000	0.1900	1.0830	70.0000	399.0000 (29a)
Total net area of external elements Aum(A, m ²)			101.1300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	27.2248	(33)
Main dwelling							
Party Wall 1			32.9300	0.0000	0.0000	70.0000	2305.1000 (32)
Party Ceiling 1			51.9600			30.0000	1558.8000 (32b)
Internal Wall 1			116.2000			9.0000	1045.8000 (32c)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) =
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							13027.6999 (34)
List of Thermal Bridges							250.7256 (35)
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					7.8100	0.0500	0.3905
E3 Sill					4.3200	0.0400	0.1728

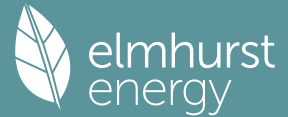
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	26.3355	26.2450	26.1563	25.7398	25.6618	25.2990	25.2990	25.2319	25.4388	25.6618	25.8195	25.9843 (38)
Heat transfer coeff	59.1689	59.0784	58.9897	58.5732	58.4953	58.1325	58.1325	58.0653	58.2722	58.4953	58.6529	58.8178 (39)
Average = Sum(39)m / 12 =												58.5728
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1.1387	1.1370	1.1353	1.1273	1.1258	1.1188	1.1188	1.1175	1.1215	1.1258	1.1288	1.1320 (40)
HLP (average)												1.1273
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

Assumed occupancy												1.7479 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	22.6252	22.2837	21.7978	21.0702	20.4144	19.5117	18.8268	19.6643	20.1038	20.9983	21.9283	22.6073 (42b)
Hot water usage for other uses	32.5301	31.3472	30.1643	28.9814	27.7985	26.6156	26.6156	27.7985	28.9814	30.1643	31.3472	32.5301 (42c)
Average daily hot water use (litres/day)												50.5518 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	55.1554	53.6309	51.9621	50.0516	48.2129	46.1273	45.4424	47.4628	49.0852	51.1626	53.2755	55.1374 (44)
Energy content (annual)	81.1983	70.9646	74.2528	65.3799	62.1272	53.3446	50.2152	55.8646	56.9364	65.9282	72.0036	80.9734 (45)
Distribution loss (46)m = 0.15 x (45)m												789.1887
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)
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	69.0185	60.3199	63.1149	55.5729	52.8081	45.3429	42.6829	47.4849	48.3959	56.0390	61.2031	68.8274 (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	69.0185	60.3199	63.1149	55.5729	52.8081	45.3429	42.6829	47.4849	48.3959	56.0390	61.2031	68.8274 (64)
12Total per year (kWh/year)												670.8104 (64a)
Electric shower(s)	42.8653	38.1933	41.7057	39.7992	40.5460	38.6770	39.9662	40.5460	39.7992	41.7057	40.9214	42.8653 (64a)
												487.5904 (64a)m =
Heat gains from water heating, kWh/month	27.9710	24.6283	26.2051	23.8430	23.3385	21.0050	20.6623	22.0077	22.0488	24.4362	25.5311	27.9232 (65)

Metabolic gains (Table 5), Watts												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	76.8290	85.0607	76.8290	79.3900	76.8290	79.3900	76.8290	76.8290	79.3900	76.8290	79.3900	76.8290 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	152.3222	153.9028	149.9197	141.4401	130.7361	120.6758	113.9550	112.3743	116.3575	124.8371	135.5411	145.6013 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395 (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)	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156 (71)
Water heating gains (Table 5)	37.5954	36.6493	35.2220	33.1153	31.3690	29.1736	27.7719	29.5803	30.6233	32.8443	35.4599	37.5311 (72)
Total internal gains	315.9650	324.8312	311.1891	303.1638	288.1525	278.4578	267.7743	268.0020	275.5892	283.7288	299.6094	309.1799 (73)

[Jan					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W			
Northeast					3.7400	11.2829	0.3500	0.7000		7.1646 (75)			
Northwest					8.6900	11.2829	0.3500	0.7000		16.6472 (81)			
Solar gains	23.8118	48.4697	87.3269	143.4159		192.7791	205.5229	192.2625	153.2739	106.4092	59.2338	29.9614	19.4459 (84)
Total gains	339.7768	373.3008	398.5160	446.5797		480.9316	483.9807	460.0368	421.2759	381.9984	342.9626	329.5708	328.6258 (83)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)	
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	61.1606	61.2543	61.3463	61.7826	61.8649	62.2510	62.2510	62.3230	62.1017	61.8649	61.6986	61.5257	
alpha	5.0774	5.0836	5.0898	5.1188	5.1243	5.1501	5.1501	5.1549	5.1401	5.1243	5.1132	5.1017	
util living area	0.9971	0.9948	0.9889	0.9630	0.8836	0.7115	0.5437	0.6104	0.8578	0.9762	0.9942	0.9976 (86)	
MIT	19.6607	19.8037	20.0481	20.4240	20.7539	20.9427	20.9882	20.9794	20.8461	20.4344	19.9924	19.6364 (87)	
Th 2	19.9693	19.9707	19.9721	19.9786	19.9798	19.9855	19.9855	19.9866	19.9833	19.9798	19.9774	19.9748 (88)	
util rest of house	0.9961	0.9930	0.9849	0.9487	0.8396	0.6209	0.4247	0.4876	0.7887	0.9642	0.9918	0.9968 (89)	
MIT 2	18.7551	18.8985	19.1420	19.5131	19.8134	19.9594	19.9826	19.9807	19.8974	19.5292	19.0921	18.7352 (90)	
Living area fraction	fLA = Living area / (4) =												0.5574 (91)
MIT	19.2599	19.4030	19.6470	20.0208	20.3376	20.5074	20.5431	20.5374	20.4261	20.0337	19.5939	19.2375 (92)	
Temperature adjustment													0.0000
adjusted MIT	19.2599	19.4030	19.6470	20.0208	20.3376	20.5074	20.5431	20.5374	20.4261	20.0337	19.5939	19.2375 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9952	0.9917	0.9833	0.9494	0.8566	0.6695	0.4913	0.5563	0.8219	0.9650	0.9907	0.9960 (94)
Useful gains	338.1518	370.1959	391.8622	424.0037	411.9851	324.0240	225.9949	234.3435	313.9557	330.9648	326.4995	327.3004 (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	885.1584	856.8159	775.5381	651.3820	505.2572	343.4142	229.2209	240.2366	368.6377	551.8277	732.8044	884.4696 (97)
Space heating kWh	406.9729	327.0086	285.4549	163.7123	69.3945	0.0000	0.0000	0.0000	0.0000	164.3220	292.5395	414.5339 (98a)
Space heating requirement - total per year (kWh/year)	2123.9387											
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	406.9729	327.0086	285.4549	163.7123	69.3945	0.0000	0.0000	0.0000	0.0000	164.3220	292.5395	414.5339 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2123.9387											
Space heating per m2	(98c) / (4) = 40.8764 (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	546.4452	430.1803	441.2962	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8311	0.9008	0.8612	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	454.1755	387.5269	380.0305	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	538.4237	512.0330	468.0891	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	60.6587	92.6326	65.5156	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
Intermittency factor (Table 10b)												1.0000 (105)
	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	15.1647	23.1581	16.3789	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	54.7017 (107)											
Energy for space heating	40.8764 (99)											
Energy for space cooling	1.0528 (108)											
Total	41.9292 (109)											
Fabric Energy Efficiency (DFEE)	41.9 (109)											

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

1. Overall dwelling characteristics

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	51.9600 (1b)	x 2.8000 (2b)	= 145.4880 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	51.9600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 145.4880 (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) =	0.1375 (8)
Pressure Test Method												Yes	
Measured/design AP50												Blower Door	
Infiltration rate												5.0000	(17)
Number of sides sheltered												0.3875	(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) =	0.3293 (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)
	0.4199	0.4117	0.4035	0.3623	0.3540	0.3129	0.3129	0.3046	0.3293	0.3540	0.3705	0.3870	(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	0.5882	0.5847	0.5814	0.5656	0.5627	0.5489	0.5489	0.5464	0.5542	0.5627	0.5686	0.5749	(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			10.5700	1.1450	12.1031		(27)
Heatloss Floor 1			51.9600	0.1300	6.7548		(28b)
External Wall 1	41.0500	10.5700	30.4800	0.1800	5.4864		(29a)
Corridor wall	8.1200	2.4200	5.7000	0.1800	1.0260		(29a)
Total net area of external elements Aum(A, m2)			101.1300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)... (30) + (32) =	27.7903		(33)
Main dwelling							
Party Wall 1			32.9300	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.7256 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				7.8100	0.0500	0.3905	
E3 Sill				4.3200	0.0500	0.2160	
E4 Jamb				21.6000	0.0500	1.0800	
E7 Party floor between dwellings (in blocks of flats)				11.2600	0.0700	0.7882	
E7 Party floor between dwellings (in blocks of flats)				2.9000	0.0700	0.2030	
E9 Balcony between dwellings, wall insulation continuous				3.4000	0.0200	0.0680	
E9 Balcony between dwellings, wall insulation continuous				3.4000	0.0200	0.0680	
E16 Corner (normal)				2.8000	0.0900	0.2520	
E18 Party wall between dwellings				5.6000	0.0600	0.3360	
E20 Exposed floor (normal)				11.2600	0.3200	3.6032	
E21 Exposed floor (inverted)				2.9000	0.3200	0.9280	
E25 Staggered party wall between dwellings				5.6000	0.0600	0.3360	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				11.7600	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)				11.7600	0.1600	1.8816	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							10.1505 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	37.9408 (37)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7479 (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	23.1411	22.7974	22.3135	21.4211	20.7529	20.0120	19.6118	20.0924	20.6157	21.4085	22.3192	23.0629 (42b)
Hot water usage for other uses	32.5301	31.3472	30.1643	28.9814	27.7985	26.6156	26.6156	27.7985	28.9814	30.1643	31.3472	32.5301 (42c)
Average daily hot water use (litres/day)												51.0283 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	55.6713	54.1447	52.4778	50.4025	48.5514	46.6276	46.2274	47.8909	49.5971	51.5728	53.6664	55.5930 (44)
Energy content (annual)	88.1697	77.1013	80.6564	68.9985	65.3595	57.3341	55.9080	59.2989	61.1581	69.9838	76.4577	87.0452 (45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m = 847.4713
	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	74.9442	65.5361	68.5579	58.6487	55.5556	48.7340	47.5218	50.4041	51.9844	59.4862	64.9890	73.9885 (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	74.9442	65.5361	68.5579	58.6487	55.5556	48.7340	47.5218	50.4041	51.9844	59.4862	64.9890	73.9885 (64)
								Total per year (kWh/year) = Sum(64)m =				720.3506 (64)
												720 (64)

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Electric shower(s)	42.8653	38.1933	41.7057	39.7992	40.5460	38.6770	39.9662	40.5460	39.7992	41.7057	40.9214	42.8653 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												487.5904 (64a)
Heat gains from water heating, kWh/month	29.4524	25.9324	27.5659	24.6120	24.0254	21.8527	21.8720	22.7375	22.9459	25.2980	26.4776	29.2134 (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	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945	87.3945 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	77.2406	85.5163	77.2406	79.8153	77.2406	79.8153	77.2406	77.2406	79.8153	77.2406	79.8153	77.2406 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	152.3222	153.9028	149.9197	141.4401	130.7361	120.6758	113.9550	112.3743	116.3575	124.8371	135.5411	145.6013 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395	31.7395 (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)	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156	-69.9156 (71)
Water heating gains (Table 5)	39.5865	38.5898	37.0509	34.1833	32.2922	30.3510	29.3979	30.5612	31.8693	34.0027	36.7745	39.2654 (72)
Total internal gains	318.3676	327.2273	313.4295	304.6570	289.4872	280.0605	269.8118	269.3945	277.2604	285.2987	301.3492	311.3256 (73)

6. Solar gains

[Jan]												Gains
	Area				Solar flux	g		FF		Access		
	m2				Table 6a	Specific data		Specific data		factor		
					W/m2	or Table 6b		or Table 6c		Table 6d		W
Northeast	3.1800				11.2829	0.6300		0.7000		0.7700		10.9653 (75)
Northwest	7.3900				11.2829	0.6300		0.7000		0.7700		25.4823 (81)
Solar gains	36.4476	74.1902	133.6671	219.5198	295.0777	314.5840	294.2869	234.6089	162.8755	90.6663	45.8605	29.7650 (83)
Total gains	354.8153	401.4175	447.0967	524.1768	584.5649	594.6445	564.0987	504.0034	440.1359	375.9649	347.2097	341.0906 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	54.6819	54.8181	54.9522	55.5910	55.7122	56.2833	56.2833	56.3903	56.0619	55.7122	55.4676	55.2142
alpha	4.6455	4.6545	4.6635	4.7061	4.7141	4.7522	4.7522	4.7594	4.7375	4.7141	4.6978	4.6809
util living area	0.9965	0.9933	0.9843	0.9454	0.8383	0.6499	0.4919	0.5658	0.8306	0.9710	0.9932	0.9971 (86)
MIT	19.4869	19.6623	19.9625	20.4098	20.7694	20.9493	20.9890	20.9796	20.8384	20.3723	19.8650	19.4647 (87)
Th 2	19.8615	19.8640	19.8665	19.8780	19.8801	19.8902	19.8902	19.8920	19.8863	19.8801	19.8758	19.8712 (88)
util rest of house	0.9953	0.9910	0.9786	0.9253	0.7834	0.5541	0.3728	0.4394	0.7519	0.9564	0.9904	0.9962 (89)
MIT 2	18.4993	18.6755	18.9743	19.4140	19.7318	19.8686	19.8876	19.8867	19.8001	19.3884	18.8869	18.4845 (90)
Living area fraction	FLA = Living area / (4) =											0.5574 (91)
MIT	19.0498	19.2255	19.5251	19.9690	20.3101	20.4709	20.5015	20.4958	20.3788	19.9368	19.4320	19.0308 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0498	19.2255	19.5251	19.9690	20.3101	20.4709	20.5015	20.4958	20.3788	19.9368	19.4320	19.0308 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9942	0.9893	0.9765	0.9272	0.8063	0.6059	0.4394	0.5100	0.7900	0.9573	0.9889	0.9952 (94)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	976.1268	945.6954	857.7508	720.5589	559.2735	377.4764	250.8523	262.8468	405.2970	606.4770	804.5635	972.0313 (97)
Space heating kWh	463.7873	368.6538	313.3519	168.8765	65.4411	0.0000	0.0000	0.0000	0.0000	183.4366	332.0597	470.6471 (98a)
Space heating requirement - total per year (kWh/year)												2366.2539
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	463.7873	368.6538	313.3519	168.8765	65.4411	0.0000	0.0000	0.0000	0.0000	183.4366	332.0597	470.6471 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2366.2539
Space heating per m ²												(98c) / (4) = 45.5399 (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	604.3850	475.7925	487.7241	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8643	0.9207	0.8806	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	522.3623	438.0513	429.5119	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	667.1111	632.9472	564.1875	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	104.2191	145.0026	100.1987	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	26.0548	36.2506	25.0497	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												87.3551 (107)

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Energy for space heating	45.5399 (99)
Energy for space cooling	1.6812 (108)
Total	47.2211 (109)
Fabric Energy Efficiency (TFEE)	47.2 (109)