

Summary for Input Data



Plot Reference	A 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	5.96	TER	18.09
Environmental	95 A	% DER < TER			67.05
CO ₂ Emissions (t/year)	0.34	DFEE	43.31	TFEE	50.99
Compliance Check	See BREL	% DFEE < TFEE			15.07
% DPER < TPER	35.88	DPER	62.75	TPER	97.87

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, Mid-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	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	262.06	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:	28.67 m	65.53 m ²	2.80 m

8.0 Living Area	36.64	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	18.62	8.85	0.00	None	9.77	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	61.66	59.24	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	30.74	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	120.06

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	65.53

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	65.53

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12.0 Opening Types

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South East	2.42	
Windows	Window	External Wall 1	North East	9.77	

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	5.08	0.05	0.05	No
E4 Jamb	Independently assessed	14.40	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	3.29	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	14.60	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.36	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	0.05	0.05	No
E16 Corner (normal)	Independently assessed	8.40	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Table K1 - Default	2.80	0.00	0.00	No
E18 Party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
E20 Exposed floor (normal)	Independently assessed	6.65	0.10	0.10	No
E21 Exposed floor (inverted)	Independently assessed	22.02	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	10.98	0.00	0.00	No
P7 Party Wall - Exposed floor (normal)	Independently assessed	10.98	0.08	0.08	No
P8 Party Wall - Exposed floor (inverted)	Independently assessed	7.42	0.24	0.24	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
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



0.31

North East

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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Compliance Check	See BREL		% DFEE < TFEE			15.07
% DPER < TPER	35.88		DPER	62.75	TPER	97.87
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	65.5300 (1b)	2.8000 (2b)	183.4840 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.5300		183.4840 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	183.4840 (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	3	(19)

Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1162 (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	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366 (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	0.2432	0.2403	0.2374	0.2229	0.2200	0.2054	0.2054	0.2025	0.2112	0.2200	0.2258	0.2316 (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							
Door			2.4200	1.0000	2.4200		(26)
Window			9.7700	1.1450	11.1870		(27)
Heatloss Floor 1			65.5300	0.1000	6.5530	110.0000	7208.3000 (28b)
External Wall 1	18.6200	9.7700	8.8500	0.1500	1.3275	70.0000	619.5001 (29a)
Corridor wall	61.6600	2.4200	59.2400	0.1900	11.2556	70.0000	4146.8000 (29a)
Total net area of external elements Aum(A, m ²)			145.8100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.7431		(33)
Main dwelling							
Party Wall 1			30.7400	0.0000	0.0000	70.0000	2151.8000 (32)
Party Ceiling 1			65.5300			30.0000	1965.9000 (32b)
Internal Wall 1			120.0600			9.0000	1080.5400 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		17172.8400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							262.0607 (35)
List of Thermal Bridges							

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.0800	0.0500	0.2540
E4 Jamb	14.4000	0.0400	0.5760
E7 Party floor between dwellings (in blocks of flats)	3.2900	0.0500	0.1645
E7 Party floor between dwellings (in blocks of flats)	14.6000	0.0390	0.5694
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0500	0.1680
E16 Corner (normal)	2.8000	0.0500	0.1400
E16 Corner (normal)	8.4000	0.0390	0.3276
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E20 Exposed floor (normal)	6.6500	0.1000	0.6650
E21 Exposed floor (inverted)	22.0200	0.1000	2.2020
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	10.9800	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	10.9800	0.0800	0.8784
P8 Party Wall - Exposed floor (inverted)	7.4200	0.2400	1.7808
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.9749 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	40.7180 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	14.7268	14.5509	14.3749	13.4950	13.3190	12.4392	12.4392	12.2632	12.7911	13.3190	13.6710	14.0229	(38)
Average = Sum(39)m / 12 =	55.4448	55.2689	55.0929	54.2130	54.0371	53.1572	53.1572	52.9812	53.5092	54.0371	54.3890	54.7410	(39)
												54.1690	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.8461	0.8434	0.8407	0.8273	0.8246	0.8112	0.8112	0.8085	0.8166	0.8246	0.8300	0.8354	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)													
Assumed occupancy													2.1329 (42)
Hot water usage for mixer showers													
Hot water usage for baths	58.4663	57.5712	56.2520	54.2227	52.4045	49.8608	47.8490	50.2009	51.3839	53.9033	56.5270	58.4136	(42a)
Hot water usage for other uses	25.3396	24.9571	24.4129	23.5980	22.8635	21.8525	21.0855	22.0234	22.5157	23.5174	24.5590	25.3195	(42b)
Hot water usage for other uses	36.4733	35.1470	33.8207	32.4944	31.1681	29.8418	29.8418	31.1681	32.4944	33.8207	35.1470	36.4733	(42c)
Average daily hot water use (litres/day)													110.5547 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	120.2791	117.6752	114.4856	110.3150	106.4361	101.5551	98.7762	103.3924	106.3939	111.2414	116.2329	120.2063	(44)
Energy content (annual)	177.0716	155.7081	163.5975	144.0990	137.1536	117.4451	109.1506	121.6948	123.4116	143.3458	157.0927	176.5318	(45)
Distribution loss (46)m = 0.15 x (45)m													
Water storage loss (or HIU loss):	26.5607	23.3562	24.5396	21.6148	20.5730	17.6168	16.3726	18.2542	18.5117	21.5019	23.5639	26.4798	(46)
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													
Primary 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	(57)
Combi loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	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	232.3484	205.6355	218.8743	197.5927	192.4304	170.9387	164.4274	176.9716	176.9053	198.6226	210.5864	231.8086	(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)
12Total per year (kWh/year)	232.3484	205.6355	218.8743	197.5927	192.4304	170.9387	164.4274	176.9716	176.9053	198.6226	210.5864	231.8086	(64)
Electric shower(s)													
Heat gains from water heating, kWh/month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													0.0000 (64a)
	103.0978	91.7149	98.6176	90.7079	89.8250	81.8454	80.5140	84.6850	83.8293	91.8839	95.0283	102.9182	(65)

5. Internal gains (see Table 5 and 5a)													
Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	99.6449	110.3211	99.6449	102.9664	99.6449	102.9664	99.6449	99.6449	102.9664	99.6449	102.9664	99.6449	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	186.6484	188.5852	183.7045	173.3140	160.1978	147.8704	139.6350	137.6982	142.5789	152.9695	166.0856	178.4130	(68)
Pumps, fans	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	(69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	(71)
Total internal gains	138.5723	136.4805	132.5506	125.9831	120.7326	113.6742	108.2177	113.8239	116.4296	123.4999	131.9837	138.3310	(72)
	479.8593	490.3806	470.8937	457.2573	435.5691	419.5048	402.4915	406.1608	416.9687	431.1080	456.0295	471.3826	(73)

6. Solar gains													
[Jan]	Area	Solar flux	g	FF	Access	Gains							

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		m2		Table 6a W/m2		Specific data or Table 6b		Specific data or Table 6c		factor Table 6d		W	
Northeast		9.7700		11.2829		0.3500		0.7000		0.7700		18.7161 (75)	
Solar gains	18.7161	38.0972	68.6391	112.7251	151.5247	161.5414	151.1186	120.4735	83.6378	46.5578	23.5497	15.2845	(83)
Total gains	498.5755	528.4778	539.5328	569.9824	587.0937	581.0462	553.6101	526.6343	500.6066	477.6659	479.5793	486.6672	(84)

7. Mean internal temperature (heating season)													

Temperature during heating periods in the living area from Table 9, Th1 (C)													
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	86.0356	86.3096	86.5853	87.9905	88.2771	89.7382	89.7382	90.0363	89.1480	88.2771	87.7058	87.1419	
alpha	6.7357	6.7540	6.7724	6.8660	6.8851	6.9825	6.9825	7.0024	6.9432	6.8851	6.8471	6.8095	
util living area	0.9928	0.9878	0.9761	0.9253	0.7962	0.5796	0.4219	0.4616	0.7119	0.9322	0.9833	0.9938	(86)
MIT	20.2827	20.3875	20.5465	20.7853	20.9413	20.9943	20.9994	20.9990	20.9785	20.8050	20.5252	20.2728	(87)
Th 2	20.2136	20.2159	20.2182	20.2297	20.2321	20.2436	20.2436	20.2460	20.2390	20.2321	20.2274	20.2228	(88)
util rest of house	0.9906	0.9840	0.9685	0.9030	0.7478	0.5138	0.3497	0.3866	0.6436	0.9074	0.9775	0.9919	(89)
MIT 2	19.3839	19.5182	19.7195	20.0164	20.1848	20.2405	20.2435	20.2456	20.2255	20.0454	19.7021	19.3787	(90)
Living area fraction	fLA = Living area / (4) = 0.5591 (91)												
MIT	19.8864	20.0042	20.1819	20.4463	20.6078	20.6620	20.6662	20.6669	20.6465	20.4701	20.1623	19.8786	(92)
Temperature adjustment	0.0000												
adjusted MIT	19.8864	20.0042	20.1819	20.4463	20.6078	20.6620	20.6662	20.6669	20.6465	20.4701	20.1623	19.8786	(93)

8. Space heating requirement													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9894	0.9828	0.9681	0.9099	0.7723	0.5505	0.3901	0.4286	0.6810	0.9159	0.9769	0.9908	(94)
Useful gains	493.3111	519.3720	522.3251	518.6009	453.4287	319.8774	215.9605	225.7174	340.9327	437.4791	468.5015	482.1889	(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	864.1881	834.7941	753.7757	625.9610	481.3520	322.2385	216.1458	226.0636	350.2994	533.3499	710.4462	858.2640	(97)
Space heating kWh	275.9325	211.9636	172.1993	77.2992	20.7749	0.0000	0.0000	0.0000	0.0000	71.3278	174.2002	279.7998	(98a)
Space heating requirement - total per year (kWh/year)	1283.4975												
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	275.9325	211.9636	172.1993	77.2992	20.7749	0.0000	0.0000	0.0000	0.0000	71.3278	174.2002	279.7998	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1283.4975												
Space heating per m2	(98c) / (4) = 19.5864 (99)												

9b. Energy requirements													

Fraction of space heat from secondary/supplementary system (Table 11)													
Fraction of space heat from community system													
Fraction of heat from community Heat pump-Space and Water													
Factor for control and charging method (Table 4c(3)) for space heating													
Factor for charging method (Table 4c(3)) for water heating													
Distribution loss factor (Table 12c) for community heating system													
Efficiency of secondary/supplementary heating system, %													
Space heating:													
Space heating requirement													
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50													
307a	413.8987	317.9455	258.2989	115.9489	31.1624	0.0000	0.0000	0.0000	0.0000	106.9918	261.3003	419.6998	
Space heating requirement	413.8987	317.9455	258.2989	115.9489	31.1624	0.0000	0.0000	0.0000	0.0000	106.9918	261.3003	419.6998	(307)
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)	0.0000 (308)												
Space heating fuel for secondary/supplementary system	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(309)
Water heating													
Annual water heating requirement													
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50													
310a	348.5226	308.4532	328.3115	296.3890	288.6457	256.4081	246.6411	265.4573	265.3580	297.9339	315.8796	347.7128	
Water heating fuel	348.5226	308.4532	328.3115	296.3890	288.6457	256.4081	246.6411	265.4573	265.3580	297.9339	315.8796	347.7128	(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	16.7685	15.1458	16.7685	16.2276	16.7685	16.2276	16.7685	16.7685	16.2276	16.7685	16.2276	16.7685	(331)
Lighting	23.1622	18.5816	16.7306	12.2576	9.4681	7.7355	8.6371	11.2269	14.5826	19.1331	21.6108	23.8059	(332)
Electricity generated by PVs (Appendix M) (negative quantity)													
(333a)m	-3.4099	-6.0625	-11.2039	-15.7980	-19.7790	-19.5208	-19.1153	-16.4376	-12.3389	-7.9156	-4.0977	-2.7831	(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	1925.2462 (307)												
Space heating fuel - secondary	0.0000 (309)												
Water heating fuel - community heating	3565.7127 (310)												
Efficiency of water heater	0.0000 (311)												
Electricity used for heat distribution	19.2525 (313)												
Space cooling fuel	0.0000 (321)												
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.8820)													
mechanical ventilation fans (SFP = 0.8820)													
197.4361 (330a)													

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Total electricity for the above, kWh/year	197.4361 (331)
Electricity for lighting (calculated in Appendix L)	186.9320 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-138.4623 (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	5736.8647 (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	2366.7927	0.1563	129.7280 (367)
Electrical energy for heat distribution (space & water)	19.2525	0.0000	8.0299 (372)
Overall CO2 factor for heat network			0.0645 (386)
Total CO2 associated with community systems			354.1472 (373)
Space and water heating			354.1472 (376)
Pumps, fans and electric keep-hot	197.4361	0.1387	27.3868 (378)
Energy for lighting	186.9320	0.1443	26.9801 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-138.4623	0.1305	-18.0695
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-18.0695 (380)
Total CO2, kg/year			390.4446 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.9600 (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	2366.7927	1.5788	1310.1404 (467)
Electrical energy for heat distribution (space & water)	19.2525	0.0000	84.6152 (472)
Overall CO2 factor for heat network			0.6796 (486)
Total CO2 associated with community systems			3731.8203 (473)
Space and water heating			3731.8203 (476)
Pumps, fans and electric keep-hot	197.4361	1.5128	298.6814 (478)
Energy for lighting	186.9320	1.5338	286.7225 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-138.4623	1.4821	-205.2111
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-205.2111 (480)
Total Primary energy kWh/year			4112.0130 (483)
Dwelling Primary energy Rate (DPER)			62.7500 (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	65.5300 (1b)	x 2.8000 (2b)	= 183.4840 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.5300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	183.4840 (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) = 0.1090 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3590 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2782 (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	0.3547	0.3478	0.3408	0.3060	0.2991	0.2643	0.2643	0.2574	0.2782	0.2991	0.3130	0.3269 (22b)
	0.5629	0.5605	0.5581	0.5468	0.5447	0.5349	0.5349	0.5331	0.5387	0.5447	0.5490	0.5534 (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			9.7700	1.1450	11.1870		(27)
Heatloss Floor 1			65.5300	0.1300	8.5189		(28b)
External Wall 1	18.6200	9.7700	8.8500	0.1800	1.5930		(29a)
Corridor wall	61.6600	2.4200	59.2400	0.1800	10.6632		(29a)
Total net area of external elements Aum(A, m2)			145.8100				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	34.3821	(33)
Main dwelling							
Party Wall 1			30.7400	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							262.0607 (35)

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

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.0800	0.0500	0.2540
E4 Jamb	14.4000	0.0500	0.7200
E7 Party floor between dwellings (in blocks of flats)	3.2900	0.0700	0.2303
E7 Party floor between dwellings (in blocks of flats)	14.6000	0.0700	1.0220
E9 Balcony between dwellings, wall insulation continuous	3.3600	0.0200	0.0672
E16 Corner (normal)	2.8000	0.0900	0.2520
E16 Corner (normal)	8.4000	0.0900	0.7560
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E20 Exposed floor (normal)	6.6500	0.3200	2.1280
E21 Exposed floor (inverted)	22.0200	0.3200	7.0464
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	10.9800	0.0000	0.0000
P7 Party Wall - Exposed floor (normal)	10.9800	0.1600	1.7568
P8 Party Wall - Exposed floor (inverted)	7.4200	0.2400	1.7808
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			16.0975 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 50.4796 (37)

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

Point Thermal bridges

Total fabric heat loss

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

(38)m	Jan 34.0846	Feb 33.9367	Mar 33.7917	Apr 33.1106	May 32.9831	Jun 32.3899	Jul 32.3899	Aug 32.2801	Sep 32.6184	Oct 32.9831	Nov 33.2409	Dec 33.5104 (38)
Heat transfer coeff	84.5642	84.4163	84.2713	83.5902	83.4628	82.8696	82.8696	82.7597	83.0981	83.4628	83.7206	83.9901 (39)
Average = Sum(39)m / 12 =												83.5896

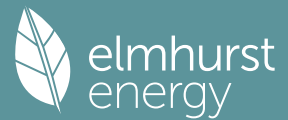
HLP	Jan 1.2905	Feb 1.2882	Mar 1.2860	Apr 1.2756	May 1.2737	Jun 1.2646	Jul 1.2646	Aug 1.2629	Sep 1.2681	Oct 1.2737	Nov 1.2776	Dec 1.2817 (40)
HLP (average)												1.2756
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1329 (42)
Hot water usage for mixer showers												
59.9817	59.0803	57.7668	55.2536	53.3989	51.3306	50.1549	51.4585	52.8875	55.1083	57.6754	59.7519	(42a)
Hot water usage for baths												
25.9173	25.5324	24.9904	23.9910	23.2426	22.4128	21.9646	22.5029	23.0889	23.9768	24.9968	25.8297	(42b)
Hot water usage for other uses												
36.4733	35.1470	33.8207	32.4944	31.1681	29.8418	29.8418	31.1681	32.4944	33.8207	35.1470	36.4733	(42c)
Average daily hot water use (litres/day)												112.4881 (43)
Daily hot water use	Jan 122.3723	Feb 119.7597	Mar 116.5778	Apr 111.7389	May 107.8096	Jun 103.5852	Jul 101.9613	Aug 105.1294	Sep 108.4708	Oct 112.9057	Nov 117.8192	Dec 122.0549 (44)
Energy conte	193.8078	170.5362	179.1758	152.9650	145.1324	127.3700	123.3134	130.1722	133.7553	153.2120	167.8551	191.1084 (45)
Energy content (annual)										Total = Sum(45)m =		1868.4036
Distribution loss (46)m = 0.15 x (45)m												
29.0712	25.5804	26.8764	22.9447	21.7699	19.1055	18.4970	19.5258	20.0633	22.9818	25.1783	28.6663	(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	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												
243.0505	215.0134	228.4184	200.6192	194.3751	175.0242	172.5560	179.4149	181.4095	202.4547	215.5092	240.3511	(62)
WWHRS	-27.4211	-24.2515	-25.3947	-21.0279	-19.5972	-16.7695	-15.7187	-16.7153	-17.3503	-20.4541	-23.1721	-26.9133 (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	215.6293	190.7620	203.0237	179.5913	174.7779	158.2548	156.8373	162.6996	164.0592	182.0005	192.3372	213.4378 (64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2193.4106 (64)
Electric shower(s)												2193 (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	103.8352	92.2851	98.9701	88.9842	87.6507	80.4739	80.3958	82.6764	82.5970	90.3371	93.9352	102.9377 (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	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	99.6449	110.3211	99.6449	102.9664	99.6449	102.9664	99.6449	99.6449	102.9664	99.6449	102.9664	99.6449 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	186.6484	188.5852	183.7045	173.3140	160.1978	147.8704	139.6350	137.6982	142.5789	152.9695	166.0856	178.4130 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169 (71)
Water heating gains (Table 5)												
	139.5635	137.3290	133.0243	123.5892	117.8100	111.7693	108.0589	111.1242	114.7180	121.4209	130.4655	138.3571 (72)
Total internal gains												
	483.8506	494.2291	474.3675	457.8633	435.6465	417.5999	402.3326	403.4611	415.2572	432.0290	457.5113	474.4088 (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	9.7700				11.2829		0.6300		0.7000		0.7700		33.6890 (75)	
Solar gains	33.6890	68.5750	123.5504	202.9052	272.7444	290.7744	272.0135	216.8523	150.5481	83.8041	42.3895	27.5122	(83)	
Total gains	517.5396	562.8042	597.9179	660.7686	708.3910	708.3744	674.3462	620.3134	565.8053	515.8331	499.9008	501.9209	(84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	56.4096	56.5084	56.6057	57.0669	57.1540	57.5632	57.5632	57.6396	57.4049	57.1540	56.9780	56.7952
alpha	4.7606	4.7672	4.7737	4.8045	4.8103	4.8375	4.8375	4.8426	4.8270	4.8103	4.7985	4.7863
util living area	0.9947	0.9912	0.9829	0.9510	0.8634	0.6918	0.5277	0.5901	0.8338	0.9651	0.9900	0.9954 (86)
MIT	19.6199	19.7673	20.0239	20.4094	20.7462	20.9377	20.9864	20.9773	20.8432	20.4291	19.9692	19.5963 (87)
Th 2	19.8483	19.8501	19.8518	19.8600	19.8615	19.8687	19.8687	19.8700	19.8659	19.8615	19.8584	19.8552 (88)
util rest of house	0.9928	0.9881	0.9765	0.9318	0.8113	0.5922	0.3988	0.4569	0.7531	0.9475	0.9859	0.9938 (89)
MIT 2	18.2676	18.4565	18.7828	19.2656	19.6508	19.8347	19.8647	19.8626	19.7609	19.2990	18.7207	18.2424 (90)
Living area fraction									fLA = Living area / (4) =			0.5591 (91)
MIT	19.0237	19.1894	19.4767	19.9051	20.2633	20.4514	20.4919	20.4859	20.3660	19.9308	19.4188	18.9994 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0237	19.1894	19.4767	19.9051	20.2633	20.4514	20.4919	20.4859	20.3660	19.9308	19.4188	18.9994 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9910	0.9857	0.9738	0.9327	0.8315	0.6458	0.4711	0.5316	0.7923	0.9488	0.9838	0.9922 (94)
Useful gains	512.8801	554.7787	582.2576	616.2796	589.0617	457.4495	317.7088	329.7573	448.2611	489.4111	491.8046	498.0010 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1245.0989	1206.2597	1093.5648	919.9221	714.7148	484.9067	322.5207	338.1451	520.6954	778.7782	1031.3350	1243.0023 (97)
Space heating kWh	544.7708	437.7952	380.4125	218.6226	93.4858	0.0000	0.0000	0.0000	0.0000	215.2891	388.4619	554.2810 (98a)
Space heating requirement - total per year (kWh/year)												2833.1189
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	544.7708	437.7952	380.4125	218.6226	93.4858	0.0000	0.0000	0.0000	0.0000	215.2891	388.4619	554.2810 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2833.1189
Space heating per m ²										(98c) / (4) =		43.2339 (99)

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)												
Fraction of space heat from main system(s)												
Efficiency of main space heating system 1 (in %)												
Efficiency of main space heating system 2 (in %)												
Efficiency of secondary/supplementary heating system, %												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	544.7708	437.7952	380.4125	218.6226	93.4858	0.0000	0.0000	0.0000	0.0000	215.2891	388.4619	554.2810 (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)	590.2176	474.3177	412.1479	236.8608	101.2848	0.0000	0.0000	0.0000	0.0000	233.2493	420.8688	600.5211 (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	215.6293	190.7620	203.0237	179.5913	174.7779	158.2548	156.8373	162.6996	164.0592	182.0005	192.3372	213.4378 (64)
Efficiency of water heater	86.0480	85.8611	85.4466	84.5019	82.7217	79.8000	79.8000	79.8000	79.8000	84.4375	85.6028	79.8000 (216)
Fuel for water heating, kWh/month	250.5919	222.1750	237.6031	212.5293	211.2843	198.3143	196.5380	203.8842	205.5879	215.5448	224.6855	247.8943 (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	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	20.7042	16.6097	14.9552	10.9568	8.4634	6.9146	7.7206	10.0355	13.0351	17.1027	19.3175	21.2797	21.2797	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-8.6934	-13.3971	-21.0261	-25.8834	-29.9502	-28.7185	-28.3748	-25.7580	-21.5396	-16.2579	-9.9548	-7.3893	-7.3893	(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	-1.9676	-4.3036	-8.8730	-13.8134	-18.7557	-19.0262	-18.7987	-15.6845	-11.2005	-6.3039	-2.6732	-1.5437	-1.5437	(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													3069.4679	(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													2626.6326	(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)													167.0950	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-359.8872	(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													5589.3084	(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	3069.4679	0.2100	644.5883	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2626.6326	0.2100	551.5929	(264)
Space and water heating			1196.1811	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	167.0950	0.1443	24.1170	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-236.9433	0.1328	-31.4596	
PV Unit electricity exported	-122.9439	0.1249	-15.3518	
Total			-46.8114	(269)
Total CO2, kg/year			1185.4159	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			18.0900	(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	3069.4679	1.1300	3468.4987	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2626.6326	1.1300	2968.0949	(278)
Space and water heating			6436.5936	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	167.0950	1.5338	256.2959	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-236.9433	1.4906	-353.1878	
PV Unit electricity exported	-122.9439	0.4583	-56.3456	
Total			-409.5333	(283)
Total Primary energy kWh/year			6413.4570	(286)
Target Primary Energy Rate (TPER)			97.8700	(287)

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Plot Reference	A 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	5.96	TER	18.09
Environmental	95 A	% DER < TER			67.05
CO ₂ Emissions (t/year)	0.34	DFEE	43.31	TFEE	50.99
Compliance Check	See BREL	% DFEE < TFEE			15.07
% DPER < TPER	35.88	DPER	62.75	TPER	97.87
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	65.5300 (1b)	2.8000 (2b)	183.4840 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	65.5300		183.4840 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 183.4840 (5)

2. Ventilation rate

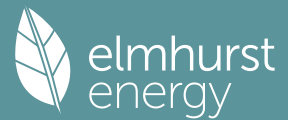
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) = 0.1090 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2590 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2007 (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	0.2559	0.2509	0.2459	0.2208	0.2158	0.1907	0.1907	0.1857	0.2007	0.2158	0.2258	0.2359 (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	0.5327	0.5315	0.5302	0.5244	0.5233	0.5182	0.5182	0.5172	0.5201	0.5233	0.5255	0.5278 (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							
Door			2.4200	1.0000	2.4200		(26)
Window			9.7700	1.1450	11.1870		(27)
Heatloss Floor 1			65.5300	0.1000	6.5530	110.0000	7208.3000 (28b)
External Wall 1	18.6200	9.7700	8.8500	0.1500	1.3275	70.0000	619.5001 (29a)
Corridor wall	61.6600	2.4200	59.2400	0.1900	11.2556	70.0000	4146.8000 (29a)
Total net area of external elements Aum(A, m ²)			145.8100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	32.7431		(33)
Main dwelling							
Party Wall 1			30.7400	0.0000	0.0000	70.0000	2151.8000 (32)
Party Ceiling 1			65.5300			30.0000	1965.9000 (32b)
Internal Wall 1			120.0600			9.0000	1080.5400 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	17172.8400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							262.0607 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					5.0800	0.0500	0.2540
E4 Jamb					14.4000	0.0400	0.5760

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E7 Party floor between dwellings (in blocks of flats)									3.2900		0.0500		0.1645
E7 Party floor between dwellings (in blocks of flats)									14.6000		0.0390		0.5694
E9 Balcony between dwellings, wall insulation continuous									3.3600		0.0500		0.1680
E16 Corner (normal)									2.8000		0.0500		0.1400
E16 Corner (normal)									8.4000		0.0390		0.3276
E17 Corner (inverted - internal area greater than external area)									2.8000		0.0000		0.0000
E18 Party wall between dwellings									2.8000		0.0500		0.1400
E20 Exposed floor (normal)									6.6500		0.1000		0.6650
E21 Exposed floor (inverted)									22.0200		0.1000		2.2020
E25 Staggered party wall between dwellings									2.8000		0.0390		0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)									10.9800		0.0000		0.0000
P7 Party Wall - Exposed floor (normal)									10.9800		0.0800		0.8784
P8 Party Wall - Exposed floor (inverted)									7.4200		0.2400		1.7808
Thermal bridges (Sum(L x Psi) calculated using Appendix K)													7.9749 (36)
Point Thermal bridges													0.0000 (36a) =
Total fabric heat loss													40.7180 (37) (33) + (36) + (36a) =
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	32.2578	32.1808	32.1053	31.7508	31.6845	31.3757	31.3757	31.3186	31.4947	31.6845	31.8187	31.9589	(38)
Average = Sum(39)m / 12 =	72.9758	72.8988	72.8233	72.4688	72.4025	72.0938	72.0938	72.0366	72.2127	72.4025	72.5367	72.6770	(39)
												72.4685	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.1136	1.1124	1.1113	1.1059	1.1049	1.1002	1.1002	1.0993	1.1020	1.1049	1.1069	1.1091	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	
												31	

4. Water heating energy requirements (kWh/year)													

Assumed occupancy													2.1329 (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	25.3396	24.9571	24.4129	23.5980	22.8635	21.8525	21.0855	22.0234	22.5157	23.5174	24.5590	25.3195	(42b)
Hot water usage for other uses	36.4733	35.1470	33.8207	32.4944	31.1681	29.8418	29.8418	31.1681	32.4944	33.8207	35.1470	36.4733	(42c)
Average daily hot water use (litres/day)												56.6533	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	61.8128	60.1040	58.2335	56.0923	54.0316	51.6942	50.9272	53.1915	55.0100	57.3381	59.7059	61.7927	(44)
Energy content (annual)	90.9992	79.5298	83.2145	73.2706	69.6251	59.7827	56.2761	62.6073	63.8089	73.8859	80.6946	90.7471	(45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Water storage loss (or HIU loss):													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month													
WWHRS	77.3493	67.6003	70.7324	62.2800	59.1814	50.8153	47.8347	53.2162	54.2375	62.8030	68.5904	77.1351	(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	(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	77.3493	67.6003	70.7324	62.2800	59.1814	50.8153	47.8347	53.2162	54.2375	62.8030	68.5904	77.1351	(64)
12Total per year (kWh/year)												751.7755	(64)
Electric shower(s)	48.0354	42.7999	46.7358	44.5994	45.4363	43.3419	44.7866	45.4363	44.5994	46.7358	45.8570	48.0354	(64a)
												546.3994	(64a)
Heat gains from water heating, kWh/month	31.3462	27.6000	29.3671	26.7199	26.1544	23.5393	23.1553	24.6631	24.7092	27.3847	28.6119	31.2926	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	99.6449	110.3211	99.6449	102.9664	99.6449	102.9664	99.6449	99.6449	102.9664	99.6449	102.9664	99.6449	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	186.6484	188.5852	183.7045	173.3140	160.1978	147.8704	139.6350	137.6982	142.5789	152.9695	166.0856	178.4130	(68)
Pumps, fans	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	(69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	(71)
Total internal gains	42.1319	41.0715	39.4718	37.1109	35.1538	32.6934	31.1227	33.1494	34.3184	36.8074	39.7387	42.0600	(72)
	383.4190	394.9716	377.8150	368.3851	349.9903	338.5241	325.3965	325.4863	334.8575	344.4156	363.7845	375.1116	(73)

6. Solar gains													

[Jan]				Area	Solar flux	g	FF	Access				Gains	
				m2	Table 6a	Specific data	Specific data	factor				W	
					W/m2	or Table 6b	or Table 6c	Table 6d					
Northeast				9.7700	11.2829	0.3500	0.7000	0.7700				18.7161	(75)
Solar gains	18.7161	38.0972	68.6391	112.7251	151.5247	161.5414	151.1186	120.4735	83.6378	46.5578	23.5497	15.2845	(83)
Total gains	402.1351	433.0689	446.4541	481.1102	501.5150	500.0654	476.5151	445.9598	418.4954	390.9734	387.3342	390.3962	(84)

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7. Mean internal temperature (heating season)												
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	65.3673	65.4364	65.5042	65.8246	65.8849	66.1671	66.1671	66.2196	66.0581	65.8849	65.7630	65.6361
alpha	5.3578	5.3624	5.3669	5.3883	5.3923	5.4111	5.4111	5.4146	5.4039	5.3923	5.3842	5.3757
util living area	0.9982	0.9970	0.9943	0.9818	0.9385	0.8082	0.6391	0.6981	0.9073	0.9858	0.9964	0.9985 (86)
MIT	19.7039	19.8232	20.0290	20.3576	20.6781	20.9090	20.9799	20.9682	20.8116	20.4162	20.0119	19.6808 (87)
Th 2	19.9897	19.9907	19.9916	19.9960	19.9969	20.0007	20.0007	20.0014	19.9992	19.9969	19.9952	19.9934 (88)
util rest of house	0.9976	0.9959	0.9920	0.9738	0.9088	0.7229	0.5076	0.5684	0.8512	0.9779	0.9949	0.9980 (89)
MIT 2	18.8102	18.9298	19.1355	19.4631	19.7667	19.9564	19.9954	19.9919	19.8884	19.5235	19.1219	18.7901 (90)
Living area fraction									fLA = Living area / (4) =			0.5591 (91)
MIT	19.3099	19.4293	19.6351	19.9632	20.2763	20.4890	20.5459	20.5378	20.4046	20.0226	19.6195	19.2881 (92)
Temperature adjustment												0.0000
adjusted MIT	19.3099	19.4293	19.6351	19.9632	20.2763	20.4890	20.5459	20.5378	20.4046	20.0226	19.6195	19.2881 (93)

8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9970	0.9951	0.9910	0.9735	0.9184	0.7677	0.5817	0.6413	0.8771	0.9782	0.9941	0.9975 (94)
Useful gains	400.9472	430.9462	442.4357	468.3427	460.5797	383.8785	277.1733	286.0041	367.0564	382.4368	385.0643	389.4193 (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	1095.3588	1059.1714	956.5412	801.7403	620.9459	424.5616	284.4725	298.0708	455.2699	682.2211	908.1261	1096.5586 (97)
Space heating kWh	516.6422	422.1674	382.4945	240.0463	119.3125	0.0000	0.0000	0.0000	0.0000	223.0395	376.6045	526.1116 (98a)
Space heating requirement - total per year (kWh/year)												2806.4184
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	516.6422	422.1674	382.4945	240.0463	119.3125	0.0000	0.0000	0.0000	0.0000	223.0395	376.6045	526.1116 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2806.4184
Space heating per m2										(98c) / (4) =		42.8265 (99)

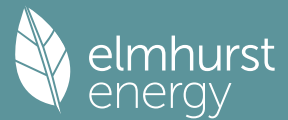
8c. Space cooling requirement												
Calculated for June, July and August. See Table 10b												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	677.6813	533.4938	547.4780	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7384	0.8315	0.7881	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	500.4335	443.5830	431.4761	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	543.5176	518.1750	484.3166	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	31.0206	55.4964	39.3133	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	7.7552	13.8741	9.8283	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												31.4576 (107)
Energy for space heating												42.8265 (99)
Energy for space cooling												0.4800 (108)
Total												43.3065 (109)
Fabric Energy Efficiency (DFEE)												43.3 (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						65.5300 (1b)	x	2.8000 (2b)	=		183.4840 (1b) - (3b)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)						65.5300					(4)	
Dwelling volume							(3a) + (3b) + (3c) + (3d) + (3e) ... (3n)	=			183.4840 (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) = 0.1090 (8)
Pressure Test Method												Yes
Measured/design AP50												Blower Door
Infiltration rate												5.0000 (17)
Number of sides sheltered												0.3590 (18)
												3 (19)
Shelter factor												(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor												(21) = (18) x (20) = 0.2782 (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)
	0.3547	0.3478	0.3408	0.3060	0.2991	0.2643	0.2643	0.2574	0.2782	0.2991	0.3130	0.3269 (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	0.5629	0.5605	0.5581	0.5468	0.5447	0.5349	0.5349	0.5331	0.5387	0.5447	0.5490	0.5534 (25)

3. Heat losses and heat loss parameter

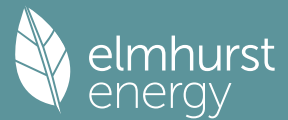
Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Main dwelling							
TER Opaque door			2.4200	1.0000	2.4200		(26)
TER Opening Type			9.7700	1.1450	11.1870		(27)
Heatloss Floor 1			65.5300	0.1300	8.5189		(28b)
External Wall 1	18.6200	9.7700	8.8500	0.1800	1.5930		(29a)
Corridor wall	61.6600	2.4200	59.2400	0.1800	10.6632		(29a)
Total net area of external elements Aum(A, m2)			145.8100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.3821		(33)
Main dwelling							
Party Wall 1			30.7400	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							262.0607 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				5.0800	0.0500	0.2540	
E4 Jamb				14.4000	0.0500	0.7200	
E7 Party floor between dwellings (in blocks of flats)				3.2900	0.0700	0.2303	
E7 Party floor between dwellings (in blocks of flats)				14.6000	0.0700	1.0220	
E9 Balcony between dwellings, wall insulation continuous				3.3600	0.0200	0.0672	
E16 Corner (normal)				2.8000	0.0900	0.2520	
E16 Corner (normal)				8.4000	0.0900	0.7560	
E17 Corner (inverted - internal area greater than external area)				2.8000	-0.0900	-0.2520	
E18 Party wall between dwellings				2.8000	0.0600	0.1680	
E20 Exposed floor (normal)				6.6500	0.3200	2.1280	
E21 Exposed floor (inverted)				22.0200	0.3200	7.0464	
E25 Staggered party wall between dwellings				2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				10.9800	0.0000	0.0000	
P7 Party Wall - Exposed floor (normal)				10.9800	0.1600	1.7568	
P8 Party Wall - Exposed floor (inverted)				7.4200	0.2400	1.7808	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							16.0975 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	50.4796 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	34.0846	33.9367	33.7917	33.1106	32.9831	32.3899	32.3899	32.2801	32.6184	32.9831	33.2409	33.5104 (38)
Average = Sum(39)m / 12 =	84.5642	84.4163	84.2713	83.5902	83.4628	82.8696	82.8696	82.7597	83.0981	83.4628	83.7206	83.9901 (39)
												83.5896
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2905	1.2882	1.2860	1.2756	1.2737	1.2646	1.2646	1.2629	1.2681	1.2737	1.2776	1.2817 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.1329 (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	25.9173	25.5324	24.9904	23.9910	23.2426	22.4128	21.9646	22.5029	23.0889	23.9768	24.9968	25.8297 (42b)
Hot water usage for other uses	36.4733	35.1470	33.8207	32.4944	31.1681	29.8418	29.8418	31.1681	32.4944	33.8207	35.1470	36.4733 (42c)
Average daily hot water use (litres/day)												57.1870 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	62.3906	60.6794	58.8110	56.4853	54.4107	52.2546	51.8064	53.6709	55.5833	57.7975	60.1438	62.3030 (44)
Energy content (annual)	98.8114	86.4066	90.3904	77.3256	73.2472	64.2531	62.6553	66.4558	68.5397	78.4306	85.6858	97.5514 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (or HIU loss):												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage												
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	83.9897	73.4456	76.8318	65.7268	62.2602	54.6151	53.2570	56.4874	58.2588	66.6660	72.8329	82.9187 (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	83.9897	73.4456	76.8318	65.7268	62.2602	54.6151	53.2570	56.4874	58.2588	66.6660	72.8329	82.9187 (64)
Total per year (kWh/year) = Sum(64)m =												807.2901 (64)

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12Total per year (kWh/year)	807 (64)										
Electric shower(s)	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =										
48.0354	42.7999	46.7358	44.5994	45.4363	43.3419	44.7866	45.4363	44.5994	46.7358	45.8570	48.0354 (64a)
											546.3994 (64a)
Heat gains from water heating, kWh/month											
33.0063	29.0614	30.8919	27.5816	26.9241	24.4893	24.5109	25.4809	25.7146	28.3505	29.6725	32.7385 (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	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461	106.6461 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	99.6449	110.3211	99.6449	102.9664	99.6449	102.9664	99.6449	99.6449	102.9664	99.6449	102.9664	99.6449 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	186.6484	188.5852	183.7045	173.3140	160.1978	147.8704	139.6350	137.6982	142.5789	152.9695	166.0856	178.4130 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646	33.6646 (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)	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169	-85.3169 (71)
Water heating gains (Table 5)	44.3633	43.2461	41.5214	38.3077	36.1883	34.0128	32.9448	34.2486	35.7147	38.1055	41.2118	44.0034 (72)
Total internal gains	385.6503	397.1462	379.8646	369.5819	351.0248	339.8435	327.2185	326.5855	336.2538	345.7136	365.2576	377.0550 (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					9.7700	11.2829	0.6300	0.7000			0.7700	33.6890 (75)
Solar gains	33.6890	68.5750	123.5504	202.9052	272.7444	290.7744	272.0135	216.8523	150.5481	83.8041	42.3895	27.5122 (83)
Total gains	419.3394	465.7213	503.4150	572.4871	623.7693	630.6179	599.2320	543.4378	486.8019	429.5177	407.6471	404.5672 (84)

7. Mean internal temperature (heating season)

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

Utilisation factor for gains for living area, nil,m (see Table 9a)												21.0000 (85)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	56.4096	56.5084	56.6057	57.0669	57.1540	57.5632	57.5632	57.6396	57.4049	57.1540	56.9780	56.7952
alpha	4.7606	4.7672	4.7737	4.8045	4.8103	4.8375	4.8375	4.8426	4.8270	4.8103	4.7985	4.7863
util living area	0.9978	0.9960	0.9914	0.9707	0.9046	0.7500	0.5857	0.6578	0.8885	0.9826	0.9958	0.9982 (86)
MIT	19.4717	19.6227	19.8875	20.2974	20.6731	20.9114	20.9789	20.9641	20.7826	20.3122	19.8320	19.4488 (87)
Th 2	19.8483	19.8501	19.8518	19.8600	19.8615	19.8687	19.8687	19.8700	19.8659	19.8615	19.8584	19.8552 (88)
util rest of house	0.9970	0.9945	0.9880	0.9581	0.8622	0.6516	0.4467	0.5168	0.8217	0.9728	0.9939	0.9975 (89)
MIT 2	18.4693	18.6211	18.8856	19.2931	19.6404	19.8290	19.8637	19.8602	19.7438	19.3138	18.8366	18.4516 (90)
Living area fraction	FLA = Living area / (4) =											0.5591 (91)
MIT	19.0298	19.1811	19.4458	19.8547	20.2178	20.4342	20.4872	20.4774	20.3246	19.8720	19.3932	19.0092 (92)
Temperature adjustment												0.0000
adjusted MIT	19.0298	19.1811	19.4458	19.8547	20.2178	20.4342	20.4872	20.4774	20.3246	19.8720	19.3932	19.0092 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9963	0.9934	0.9864	0.9580	0.8772	0.7039	0.5249	0.5960	0.8525	0.9729	0.9929	0.9969 (94)
Useful gains	417.7755	462.6401	496.5794	548.4477	547.1866	443.8828	314.5337	323.8807	415.0031	417.8810	404.7414	403.3020 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1245.6107	1205.5606	1090.9610	915.7025	710.9227	483.4765	322.1339	337.4464	517.2532	773.8675	1029.1927	1243.8220 (97)
Space heating kWh	615.9094	499.2425	442.2199	264.4235	121.8197	0.0000	0.0000	0.0000	0.0000	264.8540	449.6049	625.3469 (98a)
Space heating requirement - total per year (kWh/year)												3283.4207
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	615.9094	499.2425	442.2199	264.4235	121.8197	0.0000	0.0000	0.0000	0.0000	264.8540	449.6049	625.3469 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3283.4207
Space heating per m2												(98c) / (4) = 50.1056 (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	778.9738	613.2347	628.9737	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7789	0.8584	0.8073	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	606.7134	526.3943	507.7777	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	695.8887	661.3027	598.0663	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	64.2062	100.3719	67.1747	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	FC = cooled area / (4) =											1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	16.0516	25.0930	16.7937	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												57.9382 (107)

Full SAP Calculation Printout



Energy for space heating
Energy for space cooling
Total
Fabric Energy Efficiency (TFEE)

50.1056 (99)
0.8841 (108)
50.9898 (109)
51.0 (109)