

Summary for Input Data



Plot Reference	A 207		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	83 B	DER	4.87	TER	14.15
Environmental	96 A	% DER < TER			65.58
CO ₂ Emissions (t/year)	0.29	DFEE	30.49	TFEE	32.46
Compliance Check	See BREL	% DFEE < TFEE			6.06
% DPER < TPER	32.71	DPER	51.69	TPER	76.81

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	2
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	194.67 kJ/m ² K
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	11.29	0.00	None	7.33	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	0.90	Stairwell Access Corridor 4	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	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
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Summary for Input Data



Party Floor 1 Lowest occupied Precast concrete planks floor, screed, carpeted 40.00 65.53

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	7.33	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	4.91	0.05	0.05	No
E4 Jamb	Independently assessed	12.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	6.58	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	44.04	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	6.72	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
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	21.96	0.00	0.00	No
E3 Sill	Independently assessed	0.91	0.04	0.04	No

Y-value 0.05 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

South 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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% DPER < TPER	32.71	DPER	51.69	TPER	76.81		
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		
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			7.3300	1.1450	8.3931		(27)
External Wall 1	18.6200	7.3300	11.2900	0.1500	1.6935	70.0000	790.3001 (29a)
Corridor wall	61.6600	2.4200	59.2400	0.1800	10.6632	70.0000	4146.8000 (29a)
Total net area of external elements Aum(A, m ²)			80.2800				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	23.1698	(33)
Main dwelling							
Party Wall 1			30.7400	0.0000	0.0000	70.0000	2151.8000 (32)
Party Floor 1			65.5300			40.0000	2621.2000 (32d)
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) =	12756.5400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		194.6672 (35)
List of Thermal Bridges		

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	4.9100	0.0500	0.2455
E4 Jamb	12.6000	0.0400	0.5040
E7 Party floor between dwellings (in blocks of flats)	6.5800	0.0500	0.3290
E7 Party floor between dwellings (in blocks of flats)	44.0400	0.0360	1.5854
E9 Balcony between dwellings, wall insulation continuous	6.7200	0.0500	0.3360
E16 Corner (normal)	2.8000	0.0500	0.1400
E16 Corner (normal)	8.4000	0.0360	0.3024
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
E25 Staggered party wall between dwellings	2.8000	0.0360	0.1008
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	21.9600	0.0000	0.0000
E3 Sill	0.9100	0.0400	0.0364
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			3.7195 (36)
Point Thermal Bridges		(36a) =	0.0000
Total fabric heat loss		(33) + (36) + (36a) =	26.8894 (37)

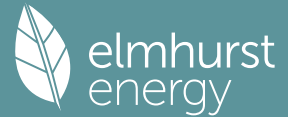
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	14.7268	14.5509	14.3749	13.4950	13.3190	12.4392	12.4392	12.2632	12.7911	13.3190	13.6710	14.0229	(38)
Heat transfer coeff	41.6162	41.4402	41.2643	40.3844	40.2084	39.3286	39.3286	39.1526	39.6805	40.2084	40.5604	40.9123	(39)
Average = Sum(39)m / 12 =												40.3404	
HLP	0.6351	0.6324	0.6297	0.6163	0.6136	0.6002	0.6002	0.5975	0.6055	0.6136	0.6190	0.6243	(40)
HLP (average)												0.6156	
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	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 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)												110.5547	(43)
Daily hot water use	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 conte	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)
Energy content (annual)										Total = Sum(45)m =		1726.3021	
Distribution loss (46)m = 0.15 x (45)m	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)
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	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)
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	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)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2377.1418	(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	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	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	106.1241	117.4946	106.1241	109.6616	106.1241	109.6616	106.1241	106.1241	109.6616	106.1241	109.6616	106.1241	(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)	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)
Total internal gains	486.3386	497.5541	477.3730	463.9525	442.0483	426.2001	408.9708	412.6400	423.6640	437.5873	462.7248	477.8619	(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								

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Northeast	7.3300				11.2829		0.3500		0.7000		0.7700		14.0419 (75)	
Solar gains	14.0419	28.5827	51.4969	84.5727	113.6823	121.1974	113.3776	90.3860	62.7498	34.9303	17.6683	11.4673	(83)	
Total gains	500.3805	526.1368	528.8699	548.5252	555.7306	547.3975	522.3484	503.0260	486.4138	472.5176	480.3931	489.3292	(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	85.1467	85.5083	85.8730	87.7439	88.1279	90.0995	90.0995	90.5045	89.3004	88.1279	87.3632	86.6117		
alpha	6.6764	6.7006	6.7249	6.8496	6.8752	7.0066	7.0066	7.0336	6.9534	6.8752	6.8242	6.7741		
util living area	0.9660	0.9487	0.9176	0.8170	0.6578	0.4587	0.3312	0.3579	0.5583	0.8139	0.9305	0.9690	(86)	
MIT	20.5266	20.6238	20.7468	20.9089	20.9811	20.9987	20.9999	20.9998	20.9950	20.9244	20.7377	20.5218	(87)	
Th 2	20.3985	20.4009	20.4033	20.4154	20.4178	20.4299	20.4299	20.4323	20.4250	20.4178	20.4130	20.4082	(88)	
util rest of house	0.9596	0.9395	0.9031	0.7905	0.6207	0.4183	0.2883	0.3138	0.5135	0.7827	0.9171	0.9631	(89)	
MIT 2	19.8538	19.9756	20.1272	20.3247	20.4016	20.4290	20.4298	20.4322	20.4215	20.3459	20.1265	19.8559	(90)	
Living area fraction														
MIT	20.2300	20.3381	20.4736	20.6513	20.7256	20.7475	20.7486	20.7496	20.7421	20.6694	20.4682	20.2282	(92)	
Temperature adjustment												0.0000		
adjusted MIT	20.2300	20.3381	20.4736	20.6513	20.7256	20.7475	20.7486	20.7496	20.7421	20.6694	20.4682	20.2282	(93)	

8. Space heating requirement														

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisation	0.9576	0.9384	0.9049	0.8015	0.6405	0.4409	0.3123	0.3384	0.5383	0.7966	0.9185	0.9611	(94)	
Useful gains	479.1784	493.7401	478.5950	439.6336	355.9386	241.3320	163.1244	170.2412	261.8466	376.4047	441.2282	470.2795	(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	662.9455	639.7568	576.6110	474.5711	362.9068	241.7729	163.1567	170.2966	263.5637	404.8732	542.2207	655.7526	(97)	
Space heating kWh	136.7227	98.1232	72.9239	25.1550	5.1844	0.0000	0.0000	0.0000	0.0000	21.1806	72.7146	137.9920	(98a)	
Space heating requirement - total per year (kWh/year)												569.9963		
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	136.7227	98.1232	72.9239	25.1550	5.1844	0.0000	0.0000	0.0000	0.0000	21.1806	72.7146	137.9920	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												569.9963		
Space heating per m2										(98c) / (4) =		8.6983	(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														
	136.7227	98.1232	72.9239	25.1550	5.1844	0.0000	0.0000	0.0000	0.0000	21.1806	72.7146	137.9920	(98)	
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50														
307a	205.0840	147.1848	109.3859	37.7325	7.7765	0.0000	0.0000	0.0000	0.0000	31.7708	109.0719	206.9880		
Space heating requirement	205.0840	147.1848	109.3859	37.7325	7.7765	0.0000	0.0000	0.0000	0.0000	31.7708	109.0719	206.9880	(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														
	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)	
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	24.6683	19.7898	17.8185	13.0546	10.0838	8.2385	9.1987	11.9569	15.5308	20.3772	23.0160	25.3539	(332)	
Electricity generated by PVs (Appendix M) (negative quantity)														
(333a)m	-3.4111	-6.0652	-11.2096	-15.8065	-19.7891	-19.5304	-19.1258	-16.4482	-12.3474	-7.9202	-4.0995	-2.7840	(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												854.9945	(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												8.5499	(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)	
Total electricity for the above, kWh/year													197.4361 (331)	
Electricity for lighting (calculated in Appendix L)													199.0870 (332)	

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Energy saving/generation technologies (Appendices M ,N and Q)

PV generation	-138.5371	(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	4678.6933	(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	1905.4773	0.1575	58.0458 (367)
Electrical energy for heat distribution (space & water)	8.5499	0.0000	6.3669 (372)
Overall CO2 factor for heat network			0.0635 (386)
Total CO2 associated with community systems			280.8020 (373)
Space and water heating			280.8020 (376)
Pumps, fans and electric keep-hot	197.4361	0.1387	27.3868 (378)
Energy for lighting	199.0870	0.1443	28.7344 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-138.5371	0.1305	-18.0792
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-18.0792 (380)
Total CO2, kg/year			318.8441 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.8700 (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	1905.4773	1.5831	583.4257 (467)
Electrical energy for heat distribution (space & water)	8.5499	0.0000	67.7554 (472)
Overall CO2 factor for heat network			0.6760 (486)
Total CO2 associated with community systems			2988.2458 (473)
Space and water heating			2988.2458 (476)
Pumps, fans and electric keep-hot	197.4361	1.5128	298.6814 (478)
Energy for lighting	199.0870	1.5338	305.3663 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-138.5371	1.4821	-205.3215
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-205.3215 (480)
Total Primary energy kWh/year			3386.9719 (483)
Dwelling Primary energy Rate (DPER)			51.6900 (484)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)

CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	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)

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)

	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)

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Adj infilt rate	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)
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			7.3300	1.1450	8.3931		(27)
External Wall 1	18.6200	7.3300	11.2900	0.1800	2.0322		(29a)
Corridor wall	61.6600	2.4200	59.2400	0.1800	10.6632		(29a)
Total net area of external elements Aum (A, m2)			80.2800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		23.5085		(33)
Main dwelling							
Party Wall 1			30.7400	0.0000	0.0000		(32)

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

194.6672 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	4.9100	0.0500	0.2455
E4 Jamb	12.6000	0.0500	0.6300
E7 Party floor between dwellings (in blocks of flats)	6.5800	0.0700	0.4606
E7 Party floor between dwellings (in blocks of flats)	44.0400	0.0700	3.0828
E9 Balcony between dwellings, wall insulation continuous	6.7200	0.0200	0.1344
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
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	21.9600	0.0000	0.0000
E3 Sill	0.9100	0.0500	0.0455

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

Point Thermal bridges	(36a) =	5.6908 (36)
Total fabric heat loss	(33) + (36) + (36a) =	29.1993 (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	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)
Heat transfer coeff	63.2840	63.1360	62.9910	62.3099	62.1825	61.5893	61.5893	61.4794	61.8178	62.1825	62.4403	62.7098 (39)
Average = Sum(39)m / 12 =												62.3093

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9657	0.9635	0.9613	0.9509	0.9489	0.9399	0.9399	0.9382	0.9434	0.9489	0.9529	0.9570 (40)
HLP (average)												0.9509
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

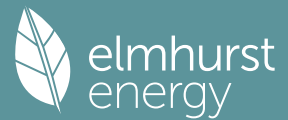
4. Water heating energy requirements (kWh/year)

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)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	122.3723	119.7597	116.5778	111.7389	107.8096	103.5852	101.9613	105.1294	108.4708	112.9057	117.8192	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	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	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)	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)

Metabolic gains (Table 5), Watts												
(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												
106.1241	117.4946	106.1241	109.6616	106.1241	109.6616	106.1241	109.6616	106.1241	109.6616	106.1241	109.6616	106.1241 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												

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Cooking gains	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	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)
negative values) (Table 5)												
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	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)
	490.3298	501.4026	480.8468	464.5586	442.1258	424.2952	408.8119	409.9404	421.9524	438.5083	464.2066	480.8881 (73)

6. Solar gains

[Jan]												
				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				7.3300	11.2829		0.6300	0.7000		0.7700		25.2754 (75)
Solar gains	25.2754	51.4488	92.6944	152.2308	204.6281	218.1552	204.0798	162.6947	112.9496	62.8745	31.8030	20.6412 (83)
Total gains	515.6053	552.8514	573.5412	616.7894	646.7539	642.4504	612.8917	572.6351	534.9020	501.3828	496.0096	501.5292 (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)												
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	55.9934	56.1246	56.2538	56.8687	56.9852	57.5341	57.5341	57.6369	57.3214	56.9852	56.7500	56.5061
util living area	4.7329	4.7416	4.7503	4.7912	4.7990	4.8356	4.8356	4.8425	4.8214	4.7990	4.7833	4.7671
	0.9826	0.9738	0.9562	0.8989	0.7782	0.5898	0.4373	0.4855	0.7234	0.9141	0.9693	0.9846 (86)
MIT	19.8628	20.0113	20.2449	20.5862	20.8445	20.9683	20.9939	20.9901	20.9177	20.6092	20.1975	19.8408 (87)
Th 2	20.1120	20.1139	20.1157	20.1245	20.1261	20.1337	20.1337	20.1352	20.1308	20.1261	20.1228	20.1194 (88)
util rest of house	0.9785	0.9677	0.9456	0.8749	0.7307	0.5186	0.3536	0.3981	0.6548	0.8887	0.9611	0.9809 (89)
MIT 2	18.7962	18.9847	19.2786	19.6993	19.9894	20.1133	20.1312	20.1307	20.0706	19.7353	19.2279	18.7738 (90)
Living area fraction	19.3925	19.5587	19.8189	20.1952	20.4675	20.5914	20.6136	20.6112	20.5442	20.2239	19.7700	19.3704 (91)
MIT	19.3925	19.5587	19.8189	20.1952	20.4675	20.5914	20.6136	20.6112	20.5442	20.2239	19.7700	19.3704 (92)
Temperature adjustment												0.0000
adjusted MIT	19.3925	19.5587	19.8189	20.1952	20.4675	20.5914	20.6136	20.6112	20.5442	20.2239	19.7700	19.3704 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9744	0.9631	0.9415	0.8771	0.7502	0.5569	0.4003	0.4468	0.6888	0.8919	0.9571	0.9771 (94)
Ext temp.	502.3949	532.4498	539.9817	540.9564	485.1956	357.8099	245.3558	255.8366	368.4277	447.1714	474.7469	490.0336 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Space heating kWh	955.1160	925.4916	838.9715	703.8027	545.1834	369.0053	247.1925	258.9032	398.3689	598.4376	791.1191	951.3301 (97)
Space heating requirement - total per year (kWh/year)	336.8244	264.1242	222.4484	117.2493	44.6309	0.0000	0.0000	0.0000	0.0000	112.5421	227.7880	343.2046 (98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	336.8244	264.1242	222.4484	117.2493	44.6309	0.0000	0.0000	0.0000	0.0000	112.5421	227.7880	343.2046 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1668.8119
Space heating per m2										(98c) / (4) =		25.4664 (99)

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (201)
Fraction of space heat from main system(s)												1.0000 (202)
Efficiency of main space heating system 1 (in %)												92.3000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating efficiency (main heating system 1)	336.8244	264.1242	222.4484	117.2493	44.6309	0.0000	0.0000	0.0000	0.0000	112.5421	227.7880	343.2046 (98)
Space heating fuel (main heating system)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
Space heating efficiency (main heating system 2)	364.9236	286.1583	241.0058	127.0307	48.3542	0.0000	0.0000	0.0000	0.0000	121.9307	246.7909	371.8360 (211)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating 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 (217)m	85.0558	84.7897	84.2651	83.1278	81.4798	79.8000	79.8000	79.8000	79.8000	83.0148	84.4401	79.8000 (216)
Fuel for water heating, kWh/month	253.5151	224.9824	240.9344	216.0423	214.5045	198.3143	196.5380	203.8842	205.5879	219.2387	227.7794	250.7521 (219)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041 (231)
Lighting	22.0505	17.6897	15.9276	11.6693	9.0137	7.3643	8.2226	10.6880	13.8827	18.2148	20.5736	22.6634 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-8.6982	-13.4061	-21.0412	-25.9017	-29.9696	-28.7362	-28.3946	-25.7798	-21.5602	-16.2722	-9.9617	-7.3934 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												

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(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-1.9627	-4.2946	-8.8579	-13.7951	-18.7362	-19.0085	-18.7789	-15.6627	-11.1799	-6.2896	-2.6664	-1.5397	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year													
Space heating fuel - main system 1												1808.0302	(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												2652.0732	(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)												177.9602	(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												4364.1764	(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	1808.0302	0.2100	379.6863	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2652.0732	0.2100	556.9354	(264)
Space and water heating			936.6217	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	177.9602	0.1443	25.6852	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-237.1149	0.1328	-31.4822	
PV Unit electricity exported	-122.7723	0.1249	-15.3293	
Total			-46.8115	(269)
Total CO2, kg/year			927.4246	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.1500	(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	1808.0302	1.1300	2043.0741	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2652.0732	1.1300	2996.8427	(278)
Space and water heating			5039.9169	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	177.9602	1.5338	272.9613	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-237.1149	1.4906	-353.4429	
PV Unit electricity exported	-122.7723	0.4583	-56.2629	
Total			-409.7058	(283)
Total Primary energy kWh/year			5033.2731	(286)
Target Primary Energy Rate (TPER)			76.8100	(287)

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Plot Reference	A 207				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	83 B	DER	4.87	TER	14.15		
Environmental	96 A	% DER < TER				65.58	
CO ₂ Emissions (t/year)	0.29	DFEE	30.49	TFEE	32.46		
Compliance Check	See BREL	% DFEE < TFEE				6.06	
% DPER < TPER	32.71	DPER	51.69	TPER	76.81		
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

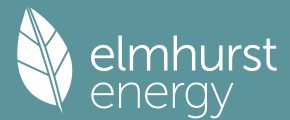
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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			7.3300	1.1450	8.3931		(27)
External Wall 1	18.6200	7.3300	11.2900	0.1500	1.6935	70.0000	790.3001 (29a)
Corridor wall	61.6600	2.4200	59.2400	0.1800	10.6632	70.0000	4146.8000 (29a)
Total net area of external elements Aum(A, m ²)			80.2800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	23.1698		(33)
Main dwelling							
Party Wall 1			30.7400	0.0000	0.0000	70.0000	2151.8000 (32)
Party Floor 1			65.5300			40.0000	2621.2000 (32a)
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) =	12756.5400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							194.6672 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				4.9100	0.0500	0.2455	
E4 Jamb				12.6000	0.0400	0.5040	

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E7 Party floor between dwellings (in blocks of flats)	6.5800	0.0500	0.3290										
E7 Party floor between dwellings (in blocks of flats)	44.0400	0.0360	1.5854										
E9 Balcony between dwellings, wall insulation continuous	6.7200	0.0500	0.3360										
E16 Corner (normal)	2.8000	0.0500	0.1400										
E16 Corner (normal)	8.4000	0.0360	0.3024										
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										
E25 Staggered party wall between dwellings	2.8000	0.0360	0.1008										
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	21.9600	0.0000	0.0000										
E3 Sill	0.9100	0.0400	0.0364										
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				3.7195 (36)									
Point Thermal bridges				0.0000									
Total fabric heat loss		(33) + (36) + (36a) =		26.8894 (37)									
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 32.2578	Feb 32.1808	Mar 32.1053	Apr 31.7508	May 31.6845	Jun 31.3757	Jul 31.3757	Aug 31.3186	Sep 31.4947	Oct 31.6845	Nov 31.8187	Dec 31.9589	(38)
Heat transfer coeff	59.1472	59.0702	58.9947	58.6402	58.5739	58.2651	58.2651	58.2079	58.3840	58.5739	58.7080	58.8483	(39)
Average = Sum(39)m / 12 =												58.6399	
HLP	Jan 0.9026	Feb 0.9014	Mar 0.9003	Apr 0.8949	May 0.8938	Jun 0.8891	Jul 0.8891	Aug 0.8883	Sep 0.8910	Oct 0.8938	Nov 0.8959	Dec 0.8980	(40)
HLP (average)												0.8949	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)													

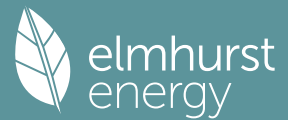
Assumed occupancy													2.1329 (42)
Hot water usage for mixer showers													
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	25.3396	24.9571	24.4129	23.5980	22.8635	21.8525	21.0855	22.0234	22.5157	23.5174	24.5590	25.3195	(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 61.8128	Feb 60.1040	Mar 58.2335	Apr 56.0923	May 54.0316	Jun 51.6942	Jul 50.9272	Aug 53.1915	Sep 55.0100	Oct 57.3381	Nov 59.7059	Dec 61.7927	(44)
Energy conte	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)
Energy content (annual)										Total = Sum (45)m =		884.4417	
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	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)
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	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)										Total per year (kWh/year) = Sum(64)m =		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 106.6461	Feb 106.6461	Mar 106.6461	Apr 106.6461	May 106.6461	Jun 106.6461	Jul 106.6461	Aug 106.6461	Sep 106.6461	Oct 106.6461	Nov 106.6461	Dec 106.6461	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	106.1241	117.4946	106.1241	109.6616	106.1241	109.6616	106.1241	106.1241	109.6616	106.1241	109.6616	106.1241	(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)	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)
Total internal gains	389.8983	402.1451	384.2943	375.0803	356.4696	345.2194	331.8757	331.9656	341.5528	350.8949	370.4798	381.5909	(73)

6. Solar gains													
[Jan]													
		Area m2		Solar flux Table 6a W/m2		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
Northeast		7.3300		11.2829		0.3500		0.7000		0.7700		14.0419	(75)
Solar gains	14.0419	28.5827	51.4969	84.5727	113.6823	121.1974	113.3776	90.3860	62.7498	34.9303	17.6683	11.4673	(83)
Total gains	403.9402	430.7278	435.7912	459.6530	470.1519	466.4167	445.2534	422.3515	404.3026	385.8252	388.1481	393.0582	(84)

Full SAP Calculation Printout



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	59.9096	59.9877	60.0644	60.4276	60.4960	60.8166	60.8166	60.8763	60.6927	60.4960	60.3577	60.2138
alpha	4.9940	4.9992	5.0043	5.0285	5.0331	5.0544	5.0544	5.0584	5.0462	5.0331	5.0238	5.0143
util living area	0.9932	0.9895	0.9829	0.9572	0.8891	0.7298	0.5602	0.6093	0.8331	0.9607	0.9873	0.9941 (86)
MIT	19.7698	19.8989	20.1038	20.4336	20.7337	20.9316	20.9854	20.9780	20.8611	20.4987	20.0908	19.7446 (87)
Th 2	20.1653	20.1663	20.1673	20.1719	20.1727	20.1767	20.1767	20.1775	20.1752	20.1727	20.1710	20.1692 (88)
util rest of house	0.9915	0.9868	0.9783	0.9448	0.8560	0.6584	0.4626	0.5112	0.7756	0.9469	0.9836	0.9926 (89)
MIT 2	19.0372	19.1662	19.3700	19.6955	19.9755	20.1392	20.1717	20.1692	20.0887	19.7621	19.3610	19.0152 (90)
Living area fraction									fLA = Living area /	(4) =		0.5591 (91)
MIT	19.4468	19.5759	19.7803	20.1082	20.3994	20.5822	20.6267	20.6214	20.5206	20.1740	19.7691	19.4231 (92)
Temperature adjustment												0.0000
adjusted MIT	19.4468	19.5759	19.7803	20.1082	20.3994	20.5822	20.6267	20.6214	20.5206	20.1740	19.7691	19.4231 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9896	0.9845	0.9757	0.9437	0.8659	0.6950	0.5169	0.5655	0.8015	0.9469	0.9814	0.9909 (94)
Useful gains	399.7516	424.0615	425.2071	433.7706	407.1161	324.1693	230.1686	238.8255	324.0606	365.3517	380.9318	389.4881 (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	895.8894	866.9076	783.4653	657.2515	509.5601	348.5556	234.6144	245.7210	374.8615	560.7861	743.7770	895.8514 (97)
Space heating kWh	369.1265	297.5926	266.5441	160.9062	76.2184	0.0000	0.0000	0.0000	0.0000	145.4032	261.2485	376.7343 (98a)
Space heating requirement - total per year (kWh/year)												1953.7738
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	369.1265	297.5926	266.5441	160.9062	76.2184	0.0000	0.0000	0.0000	0.0000	145.4032	261.2485	376.7343 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1953.7738
Space heating per m2										(98c) / (4) =		29.8150 (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	547.6919	431.1617	442.3802	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7917	0.8722	0.8419	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	433.6326	376.0692	372.4565	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	496.9292	474.6747	449.9455	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	45.5735	73.3625	57.6519	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	11.3934	18.3406	14.4130	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												44.1470 (107)
Energy for space heating												29.8150 (99)
Energy for space cooling												0.6737 (108)
Total												30.4886 (109)
Fabric Energy Efficiency (DFEE)												30.5 (109)

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY

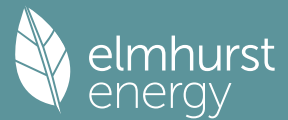
1. Overall dwelling characteristics

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)
Air changes per hour		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1090 (8)

Full SAP Calculation Printout



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)

Full SAP Calculation Printout



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	106.1241	117.4946	106.1241	109.6616	106.1241	109.6616	106.1241	106.1241	109.6616	106.1241	109.6616	106.1241 (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	392.1296	404.3197	386.3438	376.2771	357.5041	346.5388	333.6978	333.0648	342.9491	352.1929	371.9529	383.5343 (73)

6. Solar gains

[Jan]	Area m ²		Solar flux Table 6a W/m ²		Specific data or Table 6b		Specific data or Table 6c		Access factor Table 6d		Gains W	
Northeast	7.3300		11.2829		0.6300		0.7000		0.7700		25.2754 (75)	
Solar gains	25.2754	51.4488	92.6944	152.2308	204.6281	218.1552	204.0798	162.6947	112.9496	62.8745	31.8030	20.6412 (83)
Total gains	417.4050	455.7686	479.0383	528.5080	562.1322	564.6940	537.7775	495.7595	455.8986	415.0674	403.7559	404.1755 (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	55.9934	56.1246	56.2538	56.8687	56.9852	57.5341	57.5341	57.6369	57.3214	56.9852	56.7500	56.5061
alpha	4.7329	4.7416	4.7503	4.7912	4.7990	4.8356	4.8356	4.8425	4.8214	4.7990	4.7833	4.7671
util living area	0.9925	0.9876	0.9773	0.9375	0.8391	0.6558	0.4947	0.5536	0.7995	0.9538	0.9861	0.9936 (86)
MIT	19.6719	19.8288	20.0788	20.4639	20.7788	20.9504	20.9896	20.9827	20.8711	20.4796	20.0261	19.6498 (87)
Th 2	20.1120	20.1139	20.1157	20.1245	20.1261	20.1337	20.1337	20.1352	20.1308	20.1261	20.1228	20.1194 (88)
util rest of house	0.9906	0.9845	0.9712	0.9205	0.7972	0.5816	0.4017	0.4571	0.7359	0.9378	0.9820	0.9920 (89)
MIT 2	18.8984	19.0554	19.3039	19.6829	19.9688	20.1079	20.1303	20.1289	20.0533	19.7047	19.2591	18.8822 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.3309	19.4878	19.7372	20.1196	20.4217	20.5790	20.6108	20.6063	20.5106	20.1380	19.6880	19.3114 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.3309	19.4878	19.7372	20.1196	20.4217	20.5790	20.6108	20.6063	20.5106	20.1380	19.6880	19.3114 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9885	0.9817	0.9681	0.9204	0.8124	0.6208	0.4535	0.5107	0.7655	0.9380	0.9795	0.9901 (94)
Useful gains	412.6133	447.4279	463.7565	486.4182	456.6726	350.5776	243.8854	253.1858	349.0099	389.3514	395.4664	400.1562 (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	951.2157	921.0162	833.8232	699.0927	542.3360	368.2417	247.0225	258.5997	396.2863	593.0953	785.9959	947.6311 (97)
Space heating kWh	400.7202	318.2513	275.3296	153.1256	63.7335	0.0000	0.0000	0.0000	0.0000	151.5854	281.1813	407.3213 (98a)
Space heating requirement - total per year (kWh/year)	2051.2482											
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	400.7202	318.2513	275.3296	153.1256	63.7335	0.0000	0.0000	0.0000	0.0000	151.5854	281.1813	407.3213 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2051.2482											
Space heating per m ²	(98c) / (4) = 31.3024 (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	578.9390	455.7605	467.2435	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8505	0.9127	0.8801	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	492.4098	415.9876	411.2232	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	611.5760	582.5122	535.5615	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	85.7997	123.8943	92.5076	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	21.4499	30.9736	23.1269	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement	75.5504 (107)											
Energy for space heating	31.3024 (99)											
Energy for space cooling	1.1529 (108)											
Total	32.4553 (109)											
Fabric Energy Efficiency (TFEE)	32.5 (109)											

