

Summary for Input Data

Plot Reference	A 616		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	82 B	DER	5.84	TER	15.83
Environmental	96 A	% DER < TER			63.11
CO ₂ Emissions (t/year)	0.27	DFEE	35.25	TFEE	35.59
Compliance Check	See BREL	% DFEE < TFEE			0.94
% DPER < TPER	27.40	DPER	61.88	TPER	85.23

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

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

Orientation	Northeast	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Top-floor flat	
Which Floor	6	
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	162.58	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:	20.72 m	50.71 m ²	2.80 m

8.0 Living Area	25.44	m ²
-----------------	-------	----------------

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	17.92	9.58	0.00	None	8.34	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	40.10	37.68	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	22.19	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	99.82

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	50.71	50.71	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data



Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete planks floor, screed, carpeted	40.00	50.71

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	North East	2.42	
Window	Window	External Wall 1	South West	8.34	

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	5.08	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	3.04	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	14.32	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	2.80	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
E18 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	7.93	0.00	0.00	No
E3 Sill	Independently assessed	1.59	0.04	0.04	No
E14 Flat roof	Independently assessed	20.72	0.05	0.05	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	7.93	0.05	0.05	No

Y-value

0.03

 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

 Yes

Approved Installation

 Yes

Mechanical Ventilation data Type

 Database

Type

 Balanced mechanical ventilation with heat recovery

MV Reference Number

 500625

Configuration

 1

Manufacturer SFP

 0.63

Duct Type

 Rigid

MVHR Efficiency

 90.00

Wet Rooms

 1

SFP from Installer Commissioning Certificate

 No

MVHR System Location

 Inside heated envelope (installed exclusively)

Duct Installation Specification

 Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

 0

Number of open flues

 0

Number of chimneys/flues attached to closed fire

 0

Number of flues attached to solid fuel boiler

 0

Number of flues attached to other heater

 0

Number of blocked chimneys

 0

Number of intermittent extract fans

 0

Number of passive vents

 0

Summary for Input Data



Number of flueless gas fires	0									
21.0 Fixed Cooling System	No									
22.0 Pressure Testing	Yes									
Designed AP ₅₀	3.00					m ³ /(h.m ²) @ 50 Pa				
Test Method	Blower Door									
22.0 Lighting	No									
No Fixed Lighting	No									
	Name	Efficacy	Power	Capacity	Count					
	Lighting 1	75.00	15.00	1125.00	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	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	Heat pump	Electricity	Space and Water	232.00	100.00					
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									
27.0 Secondary Heating	None									
28.0 Water 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]	Connected	Connected To					
Shower	Combi boiler or unvented hot water system	8.00		No						
28.3 Waste Water Heat Recovery System										
29.0 Hot Water Cylinder	Internal Store									
Insulation Type	Measured Loss									
Cylinder Volume	180.00					L				
Loss	1.20					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									

Summary for Input Data



PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.24	South West	Horizontal	Modest		No	0.80		

34.0 Small-scale Hydro

None

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Recommendations

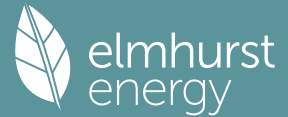
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	A 616				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	5.84	TER	15.83		
Environmental	96 A	% DER < TER				63.11	
CO ₂ Emissions (t/year)	0.27	DFEE	35.25	TFEE	35.59		
Compliance Check	See BREL	% DFEE < TFEE				0.94	
% DPER < TPER	27.40	DPER	61.88	TPER	85.23		
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	50.7100 (1b)	2.8000 (2b)	141.9880 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	141.9880 (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)

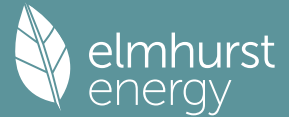
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.1162 (21)

	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			8.3400	1.1450	9.5496		(27)
External Wall 1	17.9200	8.3400	9.5800	0.1500	1.4370	70.0000	670.6000 (29a)
Corridor wall	40.1000	2.4200	37.6800	0.1900	7.1592	70.0000	2637.5999 (29a)
External Roof 1	50.7100		50.7100	0.1000	5.0710	9.0000	456.3900 (30)
Total net area of external elements A _{um} (A, m ²)			108.7300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	25.6368		(33)
Main dwelling							
Party Wall 1			22.1900	0.0000	0.0000	70.0000	1553.3000 (32)
Party Floor 1			50.7100			40.0000	2028.4000 (32d)
Internal Wall 1			99.8200			9.0000	898.3800 (32c)
Heat capacity C _m = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		8244.6699 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							162.5847 (35)
List of Thermal Bridges							

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	5.0800	0.0500	0.2540
E4 Jamb	12.6000	0.0400	0.5040
E7 Party floor between dwellings (in blocks of flats)	3.0400	0.0500	0.1520
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0390	0.5585
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)	2.8000	0.0390	0.1092
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E18 Party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.9300	0.0000	0.0000
E3 Sill	1.5900	0.0400	0.0636
E14 Flat roof	20.7200	0.0500	1.0360
P4 Party wall - Roof (insulation at ceiling level)	7.9300	0.0500	0.3965
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			3.6310 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	29.2678 (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	11.3963	11.2601	11.1239	10.4430	10.3069	9.6260	9.6260	9.4898	9.8983	10.3069	10.5792	10.8516 (38)
Average = Sum(39)m / 12 =	40.6641	40.5279	40.3917	39.7108	39.5747	38.8938	38.8938	38.7576	39.1661	39.5747	39.8470	40.1194 (39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.8019	0.7992	0.7965	0.7831	0.7804	0.7670	0.7670	0.7643	0.7724	0.7804	0.7858	0.7912 (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	1.7110 (42)											
Hot water usage for mixer showers	51.5710	50.7814	49.6178	47.8279	46.2241	43.9804	42.2058	44.2804	45.3239	47.5461	49.8604	51.5245 (42a)
Hot water usage for baths	22.3653	22.0277	21.5474	20.8281	20.1799	19.2875	18.6105	19.4384	19.8729	20.7570	21.6763	22.3476 (42b)
Hot water usage for other uses	32.1526	30.9834	29.8142	28.6450	27.4758	26.3066	26.3066	27.4758	28.6450	29.8142	30.9834	32.1526 (42c)
Average daily hot water use (litres/day)	23.4272	20.6008	21.6446	19.0649	18.1460	15.5385	14.4410	16.1007	16.3278	18.9651	20.7839	23.3557 (43)
Daily hot water use	106.0888	103.7925	100.9794	97.3010	93.8798	89.5746	87.1230	91.1946	93.8417	98.1174	102.5201	106.0246 (44)
Energy conte	156.1811	137.3384	144.2975	127.0994	120.9736	103.5900	96.2734	107.3377	108.8517	126.4341	138.5594	155.7049 (45)
Energy content (annual)	Total = Sum(45)m = 1522.6413											
Distribution loss (46)m = 0.15 x (45)m	23.4272	20.6008	21.6446	19.0649	18.1460	15.5385	14.4410	16.1007	16.3278	18.9651	20.7839	23.3557 (46)
Water storage loss (or HIU loss):	110.0000 (47)											
Store volume	b) If manufacturer declared loss factor is not known :											
Hot water storage loss factor from Table 2 (kWh/litre/day)	Volume factor from Table 2a											
Temperature factor from Table 2b	Enter (49) or (54) in (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	211.4579	187.2659	199.5743	180.5931	176.2504	157.0837	151.5502	162.6145	162.3454	181.7109	192.0530	210.9817 (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	211.4579	187.2659	199.5743	180.5931	176.2504	157.0837	151.5502	162.6145	162.3454	181.7109	192.0530	210.9817 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m = 2173.4811 (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)
Heat gains from water heating, kWh/month	96.1517	85.6070	92.2004	85.0555	84.4452	77.2386	76.2324	79.9112	78.9881	86.2608	88.8659	95.9933 (65)

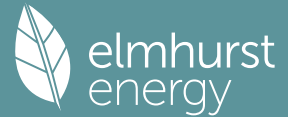
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	78.0293	86.3896	78.0293	80.6303	78.0293	80.6303	78.0293	78.0293	80.6303	78.0293	80.6303	78.0293 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.0778	150.6248	146.7265	138.4275	127.9515	118.1055	111.5278	109.9808	113.8791	122.1781	132.6541	142.5001 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551 (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)	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408 (71)
Water heating gains (Table 5)	129.2361	127.3913	123.9252	118.1326	113.5016	107.2759	102.4629	107.4076	109.7057	115.9419	123.4249	129.0233 (72)
Total internal gains	405.0085	413.0710	397.3463	385.8557	368.1477	354.6770	340.6853	344.0831	352.8805	364.8147	385.3747	398.2180 (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	

Full SAP Calculation Printout



Southwest	8.3400		36.7938		0.3500		0.7000		0.7700		52.1003 (79)	
Solar gains	52.1003	88.7461	121.4263	150.4531	168.5200	167.3014	161.2964	147.8176	131.4790	98.0834	62.4042	44.5870 (83)
Total gains	457.1089	501.8172	518.7727	536.3088	536.6677	521.9783	501.9817	491.9007	484.3595	462.8981	447.7788	442.8050 (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	56.3197	56.5089	56.6994	57.6716	57.8700	58.8831	58.8831	59.0900	58.4736	57.8700	57.4745	57.0843
alpha	4.7546	4.7673	4.7800	4.8448	4.8580	4.9255	4.9255	4.9393	4.8982	4.8580	4.8316	4.8056
util living area	0.9445	0.9153	0.8731	0.7804	0.6471	0.4703	0.3398	0.3609	0.5433	0.7772	0.9035	0.9501 (86)
MIT	20.2080	20.3810	20.5743	20.8006	20.9330	20.9889	20.9982	20.9975	20.9771	20.8331	20.5198	20.1865 (87)
Th 2	20.2517	20.2540	20.2563	20.2680	20.2703	20.2820	20.2820	20.2844	20.2774	20.2703	20.2657	20.2610 (88)
util rest of house	0.9355	0.9024	0.8541	0.7506	0.6051	0.4198	0.2849	0.3054	0.4910	0.7422	0.8870	0.9418 (89)
MIT 2	19.3434	19.5573	19.7932	20.0662	20.2108	20.2743	20.2812	20.2831	20.2603	20.1085	19.7397	19.3243 (90)
Living area fraction									fLA = Living area / (4) =			0.5017 (91)
MIT	19.7772	19.9705	20.1850	20.4346	20.5731	20.6328	20.6409	20.6415	20.6199	20.4720	20.1310	19.7568 (92)
Temperature adjustment												0.0000
adjusted MIT	19.7772	19.9705	20.1850	20.4346	20.5731	20.6328	20.6409	20.6415	20.6199	20.4720	20.1310	19.7568 (93)
8. Space heating requirement												
Utilisation	0.9289	0.8969	0.8521	0.7577	0.6229	0.4447	0.3124	0.3332	0.5161	0.7523	0.8836	0.9354 (94)
Useful gains	424.5971	450.0721	442.0679	406.3623	334.2825	232.1002	156.8102	163.9034	249.9890	348.2246	395.6721	414.1824 (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	629.3649	610.7759	552.7621	458.0495	351.1505	234.6386	157.1647	164.3918	255.3607	390.6814	519.2483	624.1304 (97)
Space heating kWh	152.3472	107.9930	82.3565	37.2148	12.5498	0.0000	0.0000	0.0000	0.0000	31.5879	88.9749	156.2013 (98a)
Space heating requirement - total per year (kWh/year)												669.2254
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	152.3472	107.9930	82.3565	37.2148	12.5498	0.0000	0.0000	0.0000	0.0000	31.5879	88.9749	156.2013 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												669.2254
Space heating per m2										(98c) / (4) =		13.1971 (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	152.3472	107.9930	82.3565	37.2148	12.5498	0.0000	0.0000	0.0000	0.0000	31.5879	88.9749	156.2013 (98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												
307a	228.5209	161.9895	123.5348	55.8222	18.8247	0.0000	0.0000	0.0000	0.0000	47.3818	133.4623	234.3020
Space heating requirement	228.5209	161.9895	123.5348	55.8222	18.8247	0.0000	0.0000	0.0000	0.0000	47.3818	133.4623	234.3020 (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	211.4579	187.2659	199.5743	180.5931	176.2504	157.0837	151.5502	162.6145	162.3454	181.7109	192.0530	210.9817 (64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50												
310a	317.1868	280.8988	299.3615	270.8896	264.3756	235.6255	227.3254	243.9218	243.5181	272.5664	288.0795	316.4725
Water heating fuel	317.1868	280.8988	299.3615	270.8896	264.3756	235.6255	227.3254	243.9218	243.5181	272.5664	288.0795	316.4725 (310)
Cooling System Energy Efficiency Ratio												0.0000 (314)
Space coolin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (315)
Pumps and Fa	11.5859	10.4647	11.5859	11.2122	11.5859	11.2122	11.5859	11.5859	11.2122	11.5859	11.2122	11.5859 (331)
Lighting	16.5885	13.3079	11.9823	8.7788	6.7810	5.5401	6.1858	8.0406	10.4439	13.7030	15.4775	17.0496 (332)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333a)m	-2.6439	-4.7041	-8.7021	-12.2851	-15.3967	-15.2025	-14.8850	-12.7901	-9.5904	-6.1447	-3.1780	-2.1575 (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												1003.8381 (307)
Space heating fuel - secondary												0.0000 (309)
Water heating fuel - community heating												3260.2216 (310)
Efficiency of water heater												0.0000 (311)
Electricity used for heat distribution												10.0384 (313)
Space cooling fuel												0.0000 (321)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)												
mechanical ventilation fans (SFP = 0.7875)												136.4150 (330a)
Total electricity for the above, kWh/year												136.4150 (331)
Electricity for lighting (calculated in Appendix L)												133.8789 (332)

Full SAP Calculation Printout



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

PV generation	-107.6802 (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	4426.6734 (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	1837.9568	0.1567	67.8118 (367)
Electrical energy for heat distribution (space & water)	10.0384	0.0000	6.1610 (372)
Overall CO2 factor for heat network			0.0637 (386)
Total CO2 associated with community systems			271.7198 (373)
Space and water heating			271.7198 (376)
Pumps, fans and electric keep-hot	136.4150	0.1387	18.9224 (378)
Energy for lighting	133.8789	0.1443	19.3229 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.6802	0.1305	-14.0505
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-14.0505 (380)
Total CO2, kg/year			295.9146 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.8400 (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	1837.9568	1.5802	683.7325 (467)
Electrical energy for heat distribution (space & water)	10.0384	0.0000	65.4283 (472)
Overall CO2 factor for heat network			0.6767 (486)
Total CO2 associated with community systems			2885.6115 (473)
Space and water heating			2885.6115 (476)
Pumps, fans and electric keep-hot	136.4150	1.5128	206.3686 (478)
Energy for lighting	133.8789	1.5338	205.3479 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-107.6802	1.4820	-159.5824
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-159.5824 (480)
Total Primary energy kWh/year			3137.7456 (483)
Dwelling Primary energy Rate (DPER)			61.8800 (484)

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

1. Overall dwelling characteristics

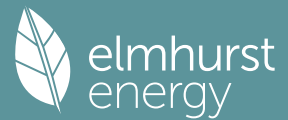
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	50.7100 (1b)	x 2.8000 (2b)	= 141.9880 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7100		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 141.9880 (5)

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) = 0.1409 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3909 (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) = 0.3029 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	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)

Full SAP Calculation Printout



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	0.3862	0.3786	0.3711	0.3332	0.3256	0.2878	0.2878	0.2802	0.3029	0.3256	0.3408	0.3559 (22b)
Effective ac	0.5746	0.5717	0.5688	0.5555	0.5530	0.5414	0.5414	0.5393	0.5459	0.5530	0.5581	0.5633 (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			8.3400	1.1450	9.5496		(27)
External Wall 1	17.9200	8.3400	9.5800	0.1800	1.7244		(29a)
Corridor wall	40.1000	2.4200	37.6800	0.1800	6.7824		(29a)
External Roof 1	50.7100		50.7100	0.1100	5.5781		(30)
Total net area of external elements Aum(A, m2)			108.7300				(31)
Fabric heat loss, W/K = Sum (A x U)					26.0545		(33)
Main dwelling							
Party Wall 1			22.1900	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							162.5847 (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	12.6000	0.0500	0.6300
E7 Party floor between dwellings (in blocks of flats)	3.0400	0.0700	0.2128
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0700	1.0024
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)	2.8000	0.0900	0.2520
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E18 Party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.9300	0.0000	0.0000
E3 Sill	1.5900	0.0500	0.0795
E14 Flat roof	20.7200	0.0800	1.6576
P4 Party wall - Roof (insulation at ceiling level)	7.9300	0.1200	0.9516
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			5.6951 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 31.7496 (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	26.9226	26.7869	26.6539	26.0291	25.9122	25.3681	25.3681	25.2673	25.5777	25.9122	26.1487	26.3959 (38)
Heat transfer coeff	58.6722	58.5365	58.4035	57.7788	57.6619	57.1177	57.1177	57.0170	57.3273	57.6619	57.8983	58.1455 (39)
Average = Sum(39)m / 12 =												57.7782
HLP	1.1570	1.1543	1.1517	1.1394	1.1371	1.1264	1.1264	1.1244	1.1305	1.1371	1.1418	1.1466 (40)
HLP (average)												1.1394
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

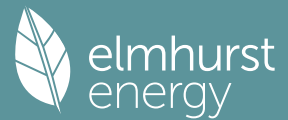
4. Water heating energy requirements (kWh/year)

Assumed occupancy												1.7110 (42)
Hot water usage for mixer showers												
52.9077	52.1126	50.9540	48.7372	47.1012	45.2768	44.2398	45.3897	46.6501	48.6090	50.8734	52.7050	(42a)
Hot water usage for baths												
22.8753	22.5355	22.0571	21.1750	20.5145	19.7821	19.3865	19.8616	20.3788	21.1625	22.0628	22.7979	(42b)
Hot water usage for other uses												
32.1526	30.9834	29.8142	28.6450	27.4758	26.3066	26.3066	27.4758	28.6450	29.8142	30.9834	32.1526	(42c)
Average daily hot water use (litres/day)												99.2177 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
107.9355	105.6315	102.8253	98.5572	95.0915	91.3656	89.9330	92.7271	95.6740	99.5857	103.9195	107.6554	(44)
Energy content (annual)	170.9434	150.4178	158.0386	134.9198	128.0115	112.3446	108.7661	114.8155	117.9755	135.1368	148.0524	168.5624 (45)
Distribution loss (46)m = 0.15 x (45)m												
25.6415	22.5627	23.7058	20.2380	19.2017	16.8517	16.3149	17.2223	17.6963	20.2705	22.2079	25.2844	(46)
Water storage loss (or HIU loss):												
Store volume												180.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.5520 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8381 (55)
Total storage loss												
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)
If cylinder contains dedicated solar storage												
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month												
220.1861	194.8951	207.2813	182.5740	177.2541	159.9988	158.0088	164.0581	165.6297	184.3795	195.7066	217.8051	(62)
WWHRS	-24.1872	-21.3913	-22.3998	-18.5479	-17.2860	-14.7917	-13.8649	-14.7439	-15.3041	-18.0418	-20.4392	-23.7393 (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	(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	(63c)
FGHRS	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												
195.9989	173.5037	184.8815	164.0261	159.9682	145.2071	144.1439	149.3142	150.3257	166.3376	175.2674	194.0658	(64)
12Total per year (kWh/year)												2003.0401 (64)
Electric shower(s)												2003 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
96.2328	85.5957	91.9420	82.9842	81.9580	75.4779	75.5589	77.5703	77.3502	84.3271	87.3508	95.4411	(65)

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

Metabolic gains (Table 5), Watts												
(66)m	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510 (66)

Full SAP Calculation Printout



Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	78.0293	86.3896	78.0293	80.6303	78.0293	80.6303	78.0293	78.0293	80.6303	78.0293	80.6303	78.0293 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.0778	150.6248	146.7265	138.4275	127.9515	118.1055	111.5278	109.9808	113.8791	122.1781	132.6541	142.5001 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408 (71)
Water heating gains (Table 5)	129.3452	127.3746	123.5779	115.2558	110.1585	104.8305	101.5576	104.2611	107.4309	113.3429	121.3205	128.2811 (72)
Total internal gains	408.1176	416.0543	399.9990	385.9789	367.8047	352.2316	339.7801	340.9366	350.6056	365.2157	386.2703	400.4758 (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	
-----				8.3400	36.7938	0.6300		0.7000		0.7700	93.7806 (79)	
Solar gains	93.7806	159.7430	218.5674	270.8156	303.3360	301.1424	290.3334	266.0717	236.6622	176.5501	112.3275	80.2566 (83)
Total gains	501.8982	575.7973	618.5664	656.7945	671.1407	653.3740	630.1135	607.0083	587.2679	541.7658	498.5978	480.7325 (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	39.0336	39.1241	39.2132	39.6372	39.7175	40.0959	40.0959	40.1668	39.9493	39.7175	39.5553	39.3871
alpha	3.6022	3.6083	3.6142	3.6425	3.6478	3.6731	3.6731	3.6778	3.6633	3.6478	3.6370	3.6258
util living area	0.9541	0.9267	0.8868	0.8084	0.6896	0.5282	0.3905	0.4206	0.6121	0.8228	0.9252	0.9596 (86)
MIT	19.5390	19.8068	20.1289	20.5074	20.7848	20.9400	20.9846	20.9796	20.8941	20.5489	19.9944	19.4927 (87)
Th 2	19.9545	19.9567	19.9588	19.9688	19.9707	19.9794	19.9794	19.9810	19.9760	19.9707	19.9669	19.9629 (88)
util rest of house	0.9452	0.9132	0.8660	0.7740	0.6363	0.4542	0.3036	0.3323	0.5391	0.7838	0.9091	0.9517 (89)
MIT 2	18.2926	18.6252	19.0207	19.4758	19.7831	19.9398	19.9728	19.9716	19.8997	19.5355	18.8711	18.2407 (90)
Living area fraction									FLA = Living area / (4) =			0.5017 (91)
MIT	18.9179	19.2180	19.5767	19.9933	20.2856	20.4415	20.4804	20.4773	20.3985	20.0439	19.4346	18.8688 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9179	19.2180	19.5767	19.9933	20.2856	20.4415	20.4804	20.4773	20.3985	20.0439	19.4346	18.8688 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9342	0.9018	0.8573	0.7749	0.6534	0.4885	0.3468	0.3760	0.5704	0.7869	0.8993	0.9413 (94)
Useful gains	468.8794	519.2692	530.3266	508.9641	438.5121	319.1986	218.5209	228.2229	334.9644	426.2912	448.3678	452.5062 (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	857.6636	838.1265	763.7240	640.9575	495.0624	333.6556	221.6396	232.4751	361.0786	544.5530	714.1552	852.9250 (97)
Space heating kWh	289.2555	214.2721	173.6477	95.0353	42.0734	0.0000	0.0000	0.0000	0.0000	87.9868	191.3669	297.9116 (98a)
Space heating requirement - total per year (kWh/year)												1391.5492
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	289.2555	214.2721	173.6477	95.0353	42.0734	0.0000	0.0000	0.0000	0.0000	87.9868	191.3669	297.9116 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1391.5492
Space heating per m2										(98c) / (4) =		27.4413 (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
	289.2555	214.2721	173.6477	95.0353	42.0734	0.0000	0.0000	0.0000	0.0000	87.9868	191.3669	297.9116 (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)	313.3862	232.1474	188.1340	102.9634	45.5833	0.0000	0.0000	0.0000	0.0000	95.3269	207.3314	322.7645 (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	195.9989	173.5037	184.8815	164.0261	159.9682	145.2071	144.1439	149.3142	150.3257	166.3376	175.2674	194.0658 (64)
Efficiency of water heater (217)m	84.9311	84.5342	83.9194	82.8816	81.5205	79.8000	79.8000	79.8000	79.8000	82.6998	84.2573	79.8000 (216)
Fuel for water heating, kWh/month	230.7741	205.2468	220.3083	197.9043	196.2305	181.9638	180.6315	187.1106	188.3780	201.1344	208.0145	228.2651 (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	16.2130	13.0066	11.7110	8.5800	6.6274	5.4147	6.0458	7.8585	10.2074	13.3927	15.1271	16.6636 (232)

Full SAP Calculation Printout



Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-9.6879	-14.7094	-22.7538	-27.6028	-31.5886	-30.1749	-29.8232	-27.2446	-23.0290	-17.6886	-11.0218	-8.2588 (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	(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	(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	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	-2.6870	-5.8370	-11.9520	-18.4760	-24.9475	-25.2455	-24.9342	-20.8604	-14.9746	-8.5003	-3.6364	-2.1104 (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	(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	(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	(235d)
Annual totals kWh/year												
Space heating fuel - main system 1												1507.6373 (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												2425.9618 (219)
Space cooling fuel												0.0000 (221)
Electricity for pumps and fans:												
Total electricity for the above, kWh/year												86.0000 (231)
Electricity for lighting (calculated in Appendix L)												130.8478 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-417.7448 (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												3732.7021 (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	1507.6373	0.2100	316.6038 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2425.9618	0.2100	509.4520 (264)
Space and water heating			826.0558 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	130.8478	0.1443	18.8854 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-253.5834	0.1331	-33.7393
PV Unit electricity exported	-164.1614	0.1251	-20.5329
Total			-54.2722 (269)
Total CO2, kg/year			802.5983 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.8300 (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	1507.6373	1.1300	1703.6301 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2425.9618	1.1300	2741.3368 (278)
Space and water heating			4444.9669 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	130.8478	1.5338	200.6988 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-253.5834	1.4916	-378.2557
PV Unit electricity exported	-164.1614	0.4591	-75.3635
Total			-453.6191 (283)
Total Primary energy kWh/year			4322.1474 (286)
Target Primary Energy Rate (TPER)			85.2300 (287)

Full SAP Calculation Printout



Plot Reference	A 616			Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	82 B	DER	5.84	TER	15.83
Environmental	96 A	% DER < TER			63.11
CO ₂ Emissions (t/year)	0.27	DFEE	35.25	TFEE	35.59
Compliance Check	See BREL	% DFEE < TFEE			0.94
% DPER < TPER	27.40	DPER	61.88	TPER	85.23
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	50.7100 (1b)	2.8000 (2b)	141.9880 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7100		141.9880 (4)
Dwelling volume			141.9880 (5)

2. Ventilation rate

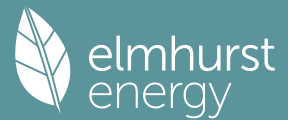
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) = 0.1409 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2909 (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) = 0.2254 (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	0.2874	0.2818	0.2761	0.2480	0.2423	0.2141	0.2141	0.2085	0.2254	0.2423	0.2536	0.2649 (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	0.5413	0.5397	0.5381	0.5307	0.5294	0.5229	0.5229	0.5217	0.5254	0.5294	0.5322	0.5351 (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			8.3400	1.1450	9.5496		(27)
External Wall 1	17.9200	8.3400	9.5800	0.1500	1.4370	70.0000	670.6000 (29a)
Corridor wall	40.1000	2.4200	37.6800	0.1900	7.1592	70.0000	2637.5999 (29a)
External Roof 1	50.7100		50.7100	0.1000	5.0710	9.0000	456.3900 (30)
Total net area of external elements A _{um} (A, m ²)			108.7300				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 25.6368		(33)
Main dwelling							
Party Wall 1			22.1900	0.0000	0.0000	70.0000	1553.3000 (32)
Party Floor 1			50.7100			40.0000	2028.4000 (32a)
Internal Wall 1			99.8200			9.0000	898.3800 (32c)
Heat capacity C _m = Sum (A x k)							(28)...(30) + (32) + (32a)...(32e) = 8244.6699 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							162.5847 (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					12.6000	0.0400	0.5040

Full SAP Calculation Printout



E7 Party floor between dwellings (in blocks of flats)	3.0400	0.0500	0.1520
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0390	0.5585
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)	2.8000	0.0390	0.1092
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E18 Party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.9300	0.0000	0.0000
E3 Sill	1.5900	0.0400	0.0636
E14 Flat roof	20.7200	0.0500	1.0360
P4 Party wall - Roof (insulation at ceiling level)	7.9300	0.0500	0.3965
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			3.6310 (36)
Point Thermal Bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	29.2678 (37)

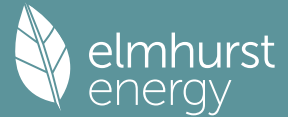
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	25.3632	25.2880	25.2144	24.8684	24.8037	24.5024	24.5024	24.4466	24.6184	24.8037	24.9346	25.0715 (38)
Average = Sum(39)m / 12 =	54.6310	54.5558	54.4822	54.1362	54.0715	53.7702	53.7702	53.7144	53.8862	54.0715	54.2024	54.3393 (39)
												54.1359
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0773	1.0758	1.0744	1.0676	1.0663	1.0603	1.0603	1.0592	1.0626	1.0663	1.0689	1.0716 (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												1.7110 (42)
Hot water usage for mixer showers												
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	22.3653	22.0277	21.5474	20.8281	20.1799	19.2875	18.6105	19.4384	19.8729	20.7570	21.6763	22.3476 (42b)
Hot water usage for other uses	32.1526	30.9834	29.8142	28.6450	27.4758	26.3066	26.3066	27.4758	28.6450	29.8142	30.9834	32.1526 (42c)
Average daily hot water use (litres/day)												49.9675 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	54.5179	53.0111	51.3616	49.4731	47.6557	45.5942	44.9172	46.9142	48.5179	50.5712	52.6597	54.5001 (44)
Energy conte	80.2597	70.1444	73.3946	64.6243	61.4092	52.7281	49.6348	55.2189	56.2783	65.1661	71.1714	80.0374 (45)
Energy content (annual)										Total = Sum(45)m =		780.0672
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												
	68.2208	59.6227	62.3854	54.9306	52.1978	44.8189	42.1896	46.9360	47.8365	55.3912	60.4956	68.0318 (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	68.2208	59.6227	62.3854	54.9306	52.1978	44.8189	42.1896	46.9360	47.8365	55.3912	60.4956	68.0318 (64)
								Total per year (kWh/year) = Sum(64)m =				663.0571 (64)
12Total per year (kWh/year)												663 (64)
Electric shower(s)												
	42.3702	37.7522	41.2240	39.3395	40.0777	38.2303	39.5046	40.0777	39.3395	41.2240	40.4488	42.3702 (64a)
								Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =				481.9588 (64a)
Heat gains from water heating, kWh/month												
	27.6477	24.3437	25.9024	23.5675	23.0689	20.7623	20.4235	21.7534	21.7940	24.1538	25.2361	27.6005 (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	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510 (66)
	78.0293	86.3896	78.0293	80.6303	78.0293	80.6303	78.0293	78.0293	80.6303	78.0293	80.6303	78.0293 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.0778	150.6248	146.7265	138.4275	127.9515	118.1055	111.5278	109.9808	113.8791	122.1781	132.6541	142.5001 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551 (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)	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408 (71)
Water heating gains (Table 5)	37.1609	36.2258	34.8150	32.7327	31.0066	28.8365	27.4510	29.2385	30.2695	32.4648	35.0502	37.0975 (72)
Total internal gains	312.9334	321.9055	308.2361	300.4558	285.6527	276.2376	265.6734	265.9140	273.4442	281.3376	296.9999	306.2922 (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											
Southwest	8.3400							0.7000		0.7700		52.1003 (79)
Solar gains	52.1003	88.7461	121.4263	150.4531	168.5200	167.3014	161.2964	147.8176	131.4790	98.0834	62.4042	44.5870 (83)
Total gains	365.0337	410.6516	429.6624	450.9089	454.1727	443.5390	426.9698	413.7316	404.9232	379.4209	359.4041	350.8792 (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	41.9210	41.9788	42.0355	42.3041	42.3548	42.5921	42.5921	42.6364	42.5004	42.3548	42.2525	42.1460
alpha	3.7947	3.7986	3.8024	3.8203	3.8237	3.8395	3.8395	3.8424	3.8334	3.8237	3.8168	3.8097
util living area	0.9812	0.9696	0.9524	0.9104	0.8310	0.6831	0.5269	0.5610	0.7580	0.9150	0.9681	0.9837 (86)
MIT	19.3509	19.5704	19.8660	20.2704	20.6256	20.8770	20.9653	20.9553	20.8062	20.3578	19.7907	19.3080 (87)
Th 2	20.0194	20.0206	20.0218	20.0274	20.0285	20.0333	20.0333	20.0343	20.0315	20.0285	20.0263	20.0241 (88)
util rest of house	0.9773	0.9632	0.9420	0.8895	0.7893	0.6065	0.4224	0.4576	0.6908	0.8912	0.9603	0.9803 (89)
MIT 2	18.5254	18.7423	19.0332	19.4268	19.7543	19.9642	20.0206	20.0166	19.9122	19.5161	18.9661	18.4865 (90)
Living area fraction									fLA = Living area /	(4) =		0.5017 (91)
MIT	18.9395	19.1578	19.4510	19.8500	20.1914	20.4221	20.4945	20.4875	20.3607	19.9384	19.3798	18.8986 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9395	19.1578	19.4510	19.8500	20.1914	20.4221	20.4945	20.4875	20.3607	19.9384	19.3798	18.8986 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9716	0.9563	0.9347	0.8851	0.7970	0.6389	0.4737	0.5078	0.7154	0.8886	0.9538	0.9751 (94)
Useful gains	354.6773	392.6870	401.5878	399.1010	361.9672	283.3891	202.2608	210.0867	289.6656	337.1474	342.8161	342.1433 (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	799.7702	777.8447	705.5984	592.7915	459.1449	313.0552	209.4106	219.5574	337.3661	504.9399	665.5937	798.7135 (97)
Space heating kWh	331.1491	258.8260	226.1839	139.4572	72.3002	0.0000	0.0000	0.0000	0.0000	124.8376	232.3999	339.6882 (98a)
Space heating requirement - total per year (kWh/year)												1724.8421
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	331.1491	258.8260	226.1839	139.4572	72.3002	0.0000	0.0000	0.0000	0.0000	124.8376	232.3999	339.6882 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1724.8421
Space heating per m2										(98c) / (4) =		34.0138 (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	505.4396	397.8992	408.2292	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7798	0.8544	0.8357	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	394.1345	339.9755	341.1450	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	488.6852	471.0132	456.9494	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	68.0765	97.4921	86.1585	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	17.0191	24.3730	21.5396	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												62.9318 (107)
Energy for space heating												34.0138 (99)
Energy for space cooling												1.2410 (108)
Total												35.2549 (109)
Fabric Energy Efficiency (DFEE)												35.3 (109)

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

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	50.7100 (1b)	x 2.8000 (2b)	= 141.9880 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	50.7100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	141.9880 (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	

Full SAP Calculation Printout



Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 20.0000 / (5) = 0.1409 (8)
Pressure test Yes
Pressure Test Method Blower Door
Measured/design AP50 5.0000 (17)
Infiltration rate 0.3909 (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) = 0.3029 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	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	0.3862	0.3786	0.3711	0.3332	0.3256	0.2878	0.2878	0.2802	0.3029	0.3256	0.3408	0.3559	(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	0.5746	0.5717	0.5688	0.5555	0.5530	0.5414	0.5414	0.5393	0.5459	0.5530	0.5581	0.5633	(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			8.3400	1.1450	9.5496			(27)
External Wall 1	17.9200	8.3400	9.5800	0.1800	1.7244			(29a)
Corridor wall	40.1000	2.4200	37.6800	0.1800	6.7824			(29a)
External Roof 1	50.7100		50.7100	0.1100	5.5781			(30)
Total net area of external elements Aum (A, m2)			108.7300					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 26.0545			(33)
Main dwelling								
Party Wall 1			22.1900	0.0000	0.0000			(32)

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

162.5847 (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	12.6000	0.0500	0.6300	
E7 Party floor between dwellings (in blocks of flats)	3.0400	0.0700	0.2128	
E7 Party floor between dwellings (in blocks of flats)	14.3200	0.0700	1.0024	
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)	2.8000	0.0900	0.2520	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
E18 Party wall between dwellings	2.8000	0.0600	0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	7.9300	0.0000	0.0000	
E3 Sill	1.5900	0.0500	0.0795	
E14 Flat roof	20.7200	0.0800	1.6576	
P4 Party wall - Roof (insulation at ceiling level)	7.9300	0.1200	0.9516	

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

5.6951 (36)

Point Thermal bridges

(33) + (36) + (36a) = 31.7496 (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	
	26.9226	26.7869	26.6539	26.0291	25.9122	25.3681	25.3681	25.2673	25.5777	25.9122	26.1487	26.3959	(38)
Heat transfer coeff	58.6722	58.5365	58.4035	57.7788	57.6619	57.1177	57.1177	57.0170	57.3273	57.6619	57.8983	58.1455	(39)
Average = Sum(39)m / 12 =													57.7782

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	1.1570	1.1543	1.1517	1.1394	1.1371	1.1264	1.1264	1.1244	1.1305	1.1371	1.1418	1.1466	(40)
HLP (average)													1.1394
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													1.7110 (42)
Hot water usage for mixer showers													0.0000 (42a)
Hot water usage for baths	22.8753	22.5355	22.0571	21.1750	20.5145	19.7821	19.3865	19.8616	20.3788	21.1625	22.0628	22.7979	(42b)
Hot water usage for other uses	32.1526	30.9834	29.8142	28.6450	27.4758	26.3066	26.3066	27.4758	28.6450	29.8142	30.9834	32.1526	(42c)
Average daily hot water use (litres/day)													50.4386 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	55.0278	53.5189	51.8713	49.8200	47.9903	46.0887	45.6931	47.3374	49.0238	50.9767	53.0462	54.9505	(44)
Energy conte	87.1506	76.2102	79.7243	68.2011	64.6042	56.6715	55.2619	58.6136	60.4513	69.1749	75.5740	86.0392	(45)
Energy content (annual)										Total = Sum(45)m =			837.6766
Distribution loss (46)m = 0.15 x (45)m													0.0000 (46)
Water storage loss (or HIU loss):													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	74.0780	64.7787	67.7656	57.9709	54.9136	48.1708	46.9726	49.8215	51.3836	58.7987	64.2379	73.1333	(62)
WWHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h	74.0780	64.7787	67.7656	57.9709	54.9136	48.1708	46.9726	49.8215	51.3836	58.7987	64.2379	73.1333	(64)
12Total per year (kWh/year)								Total per year (kWh/year) = Sum(64)m =					712.0251 (64)
Electric shower(s)	42.3702	37.7522	41.2240	39.3395	40.0777	38.2303	39.5046	40.0777	39.3395	41.2240	40.4488	42.3702	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													481.9588 (64a)

Full SAP Calculation Printout



Heat gains from water heating, kWh/month
29.1121 25.6327 27.2474 24.3276 23.7478 21.6003 21.6193 22.4748 22.6808 25.0057 26.1717 28.8759 (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	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	85.5510	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	78.0293	86.3896	78.0293	80.6303	78.0293	80.6303	78.0293	78.0293	80.6303	78.0293	80.6303	78.0293	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	149.0778	150.6248	146.7265	138.4275	127.9515	118.1055	111.5278	109.9808	113.8791	122.1781	132.6541	142.5001	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	31.5551	(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)	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	-68.4408	(71)
Water heating gains (Table 5)	39.1291	38.1439	36.6228	33.7884	31.9191	30.0004	29.0582	30.2081	31.5011	33.6098	36.3495	38.8117	(72)
Total internal gains	314.9016	323.8236	310.0440	301.5115	286.5652	277.4015	267.2806	266.8836	274.6758	282.4825	298.2993	308.0064	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W

Southwest					8.3400	36.7938	0.6300	0.7000			0.7700			93.7806 (79)

Solar gains	93.7806	159.7430	218.5674	270.8156	303.3360	301.1424	290.3334	266.0717	236.6622	176.5501	112.3275	80.2566	(83)	
Total gains	408.6821	483.5666	528.6113	572.3270	589.9012	578.5439	557.6141	532.9553	511.3381	459.0326	410.6268	388.2630	(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	39.0336	39.1241	39.2132	39.6372	39.7175	40.0959	40.0959	40.1668	39.9493	39.7175	39.5553	39.3871	
alpha	3.6022	3.6083	3.6142	3.6425	3.6478	3.6731	3.6731	3.6778	3.6633	3.6478	3.6370	3.6258	
util living area	0.9746	0.9540	0.9228	0.8554	0.7460	0.5831	0.4371	0.4730	0.6756	0.8756	0.9557	0.9785	(86)
MIT	19.3040	19.5960	19.9515	20.3861	20.7180	20.9170	20.9777	20.9700	20.8529	20.4204	19.7928	19.2546	(87)
Th 2	19.9545	19.9567	19.9588	19.9688	19.9707	19.9794	19.9794	19.9810	19.9760	19.9707	19.9669	19.9629	(88)
util rest of house	0.9692	0.9448	0.9070	0.8259	0.6949	0.5054	0.3415	0.3761	0.6019	0.8438	0.9451	0.9739	(89)
MIT 2	18.4311	18.7179	19.0636	19.4800	19.7743	19.9357	19.9718	19.9700	19.8907	19.5222	18.9221	18.3886	(90)
Living area fraction	18.8690	19.1584	19.5090	19.9346	20.2477	20.4280	20.4764	20.4717	20.3734	19.9728	19.3589	18.8230	(91)
MIT	18.8690	19.1584	19.5090	19.9346	20.2477	20.4280	20.4764	20.4717	20.3734	19.9728	19.3589	18.8230	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.8690	19.1584	19.5090	19.9346	20.2477	20.4280	20.4764	20.4717	20.3734	19.9728	19.3589	18.8230	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9622	0.9361	0.8991	0.8248	0.7095	0.5407	0.3889	0.4238	0.6320	0.8439	0.9375	0.9675	(94)
Useful gains	393.2178	452.6884	475.2599	472.0524	418.5448	312.8046	216.8645	225.8603	323.1815	387.3590	384.9487	375.6271	(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	854.7979	834.6389	759.7722	637.5645	492.8786	332.8820	221.4137	232.1555	359.6374	540.4536	709.7691	850.2652	(97)
Space heating kWh	343.4156	256.6707	211.6771	119.1687	55.3044	0.0000	0.0000	0.0000	0.0000	113.9024	233.8707	353.1307	(98a)
Space heating requirement - total per year (kWh/year)												1687.1404	
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	343.4156	256.6707	211.6771	119.1687	55.3044	0.0000	0.0000	0.0000	0.0000	113.9024	233.8707	353.1307	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1687.1404	
Space heating per m2										(98c) / (4) =		33.2704	(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	536.9066	422.6712	433.3289	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8522	0.9077	0.8910	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	457.5600	383.6767	386.0887	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	646.2867	623.4430	596.1381	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	135.8832	178.3861	156.2768	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	33.9708	44.5965	39.0692	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												117.6365	(107)
Energy for space heating												33.2704	(99)
Energy for space cooling												2.3198	(108)
Total												35.5902	(109)
Fabric Energy Efficiency (TFEE)												35.6	(109)

