

Summary for Input Data

Plot Reference	A 205		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	84 B	DER	4.49	TER	13.17
Environmental	96 A	% DER < TER			65.91
CO ₂ Emissions (t/year)	0.34	DFEE	32.57	TFEE	34.51
Compliance Check	See BREL	% DFEE < TFEE			5.62
% DPER < TPER	33.33	DPER	47.41	TPER	71.11

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

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

Orientation	Southeast	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	2	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	178.00	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:	34.12 m	86.15 m ²	2.80 m

8.0 Living Area	38.77	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	54.88	41.43	0.00	None	13.45	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	40.66	38.24	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	27.86	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	197.43

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	86.15

Description	Storey Index	Construction	Kappa (kJ/m ² K)	Area (m ²)
-------------	--------------	--------------	-----------------------------	------------------------

Summary for Input Data

Party Floor 1 Lowest occupied Precast concrete planks floor, screed, carpeted 40.00 86.15

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	
NW windows	Window	External Wall 1	North West	7.48	
NE windows	Window	External Wall 1	North East	5.96	

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	8.49	0.05	0.05	No
E4 Jamb	Independently assessed	21.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	30.48	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	29.04	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	8.72	0.05	0.05	No
E16 Corner (normal)	Independently assessed	5.60	0.05	0.05	No
E16 Corner (normal)	Independently assessed	5.60	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	19.90	0.00	0.00	No
E3 Sill	Independently assessed	4.99	0.04	0.04	No

Y-value 0.05 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	2
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	89.00
Wet Rooms	2
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	m³/(h.m²) @ 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
			8
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
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		Community Heating	
Water 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	
Shower 2	Combi boiler or unvented hot water system	8.00	
			Connected
			No
			Connected To
			No
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		

Summary for Input Data



PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
0.41	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



Plot Reference	A 205			Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	84 B	DER	4.49	TER	13.17
Environmental	96 A	% DER < TER			65.91
CO ₂ Emissions (t/year)	0.34	DFEE	32.57	TFEE	34.51
Compliance Check	See BREL	% DFEE < TFEE			5.62
% DPER < TPER	33.33	DPER	47.41	TPER	71.11
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	86.1500 (1b)	2.8000 (2b)	241.2200 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	86.1500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	241.2200 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.0000	(17)
Infiltration rate	0.1500	(18)
Number of sides sheltered	2	(19)

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

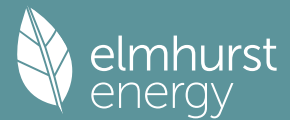
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (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			13.4500	1.1450	15.4008		(27)
External Wall 1	54.8800	13.4500	41.4300	0.1500	6.2145	70.0000	2900.1001 (29a)
Corridor wall	40.6600	2.4200	38.2400	0.1800	6.8832	70.0000	2676.8000 (29a)
Total net area of external elements Aum(A, m ²)			95.5400				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	30.9185	(33)
Main dwelling							
Party Wall 1			27.8600	0.0000	0.0000	70.0000	1950.2000 (32)
Party Floor 1			86.1500			40.0000	3446.0000 (32d)
Party Ceiling 1			86.1500			30.0000	2584.5000 (32b)
Internal Wall 1			197.4300			9.0000	1776.8699 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	15334.4700 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		177.9973 (35)
List of Thermal Bridges		

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	8.4900	0.0500	0.4245
E4 Jamb	21.6000	0.0400	0.8640
E7 Party floor between dwellings (in blocks of flats)	30.4800	0.0500	1.5240
E7 Party floor between dwellings (in blocks of flats)	29.0400	0.0360	1.0454
E9 Balcony between dwellings, wall insulation continuous	8.7200	0.0500	0.4360
E16 Corner (normal)	5.6000	0.0500	0.2800
E16 Corner (normal)	5.6000	0.0360	0.2016
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)	19.9000	0.0000	0.0000
E3 Sill	4.9900	0.0400	0.1996
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			5.2159 (36)
Point Thermal Bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 36.1344 (37)

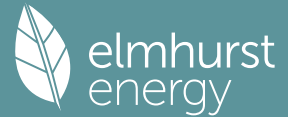
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	20.8609	20.6071	20.3534	19.0847	18.8310	17.5623	17.5623	17.3086	18.0698	18.8310	19.3385	19.8459	(38)
Heat transfer coeff	56.9953	56.7415	56.4878	55.2191	54.9654	53.6967	53.6967	53.4430	54.2042	54.9654	55.4729	55.9803	(39)
Average = Sum(39)m / 12 =												55.1557	
HLP	0.6616	0.6586	0.6557	0.6410	0.6380	0.6233	0.6233	0.6203	0.6292	0.6380	0.6439	0.6498	(40)
HLP (average)												0.6402	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.5693 (42)
Hot water usage for mixer showers	65.5977	64.5934	63.1134	60.8365	58.7966	55.9426	53.6853	56.3242	57.6515	60.4782	63.4219	65.5386 (42a)
Hot water usage for baths	28.4157	27.9867	27.3765	26.4626	25.6390	24.5053	23.6451	24.6969	25.2489	26.3723	27.5403	28.3931 (42b)
Hot water usage for other uses	40.9419	39.4531	37.9643	36.4755	34.9867	33.4979	33.4979	34.9867	36.4755	37.9643	39.4531	40.9419 (42c)
Average daily hot water use (litres/day)												124.0440 (43)
Daily hot water use	134.9553	132.0333	128.4542	123.7747	119.4223	113.9458	110.8284	116.0079	119.3760	124.8148	130.4154	134.8736 (44)
Energy conte	198.6775	174.7067	183.5584	161.6807	153.8877	131.7745	122.4686	136.5434	138.4701	160.8365	176.2607	198.0718 (45)
Energy content (annual)										Total = Sum(45)m =		1936.9369
Distribution loss (46)m = 0.15 x (45)m	29.8016	26.2060	27.5338	24.2521	23.0832	19.7662	18.3703	20.4815	20.7705	24.1255	26.4391	29.7108 (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	253.9543	224.6342	238.8352	215.1744	209.1645	185.2682	177.7455	191.8202	191.9638	216.1133	229.7544	253.3486 (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	253.9543	224.6342	238.8352	215.1744	209.1645	185.2682	177.7455	191.8202	191.9638	216.1133	229.7544	253.3486 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2587.7767 (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	110.2817	98.0319	105.2546	96.5538	95.3891	86.6100	84.9423	89.6221	88.8363	97.6996	101.4016	110.0803 (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	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	122.5838	135.7178	122.5838	126.6699	122.5838	126.6699	122.5838	122.5838	126.6699	122.5838	126.6699	122.5838 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	231.8138	234.2193	228.1576	215.2527	198.9627	183.6524	173.4241	171.0186	177.0804	189.9852	206.2753	221.5856 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464 (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)	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709 (71)
Water heating gains (Table 5)	148.2281	145.8809	141.4713	134.1025	128.2112	120.2916	114.1697	120.4599	123.3837	131.3167	140.8356	147.9574 (72)
Total internal gains	564.1649	577.3571	553.7517	537.5642	511.2968	492.1530	471.7167	475.6014	488.6731	505.4248	535.3199	553.6659 (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



Northeast	5.9600		11.2829		0.3500		0.7000		0.7700		11.4174 (75)	
Northwest	7.4900		11.2829		0.3500		0.7000		0.7700		14.3484 (81)	
Solar gains	25.7658	52.4471	94.4929	155.1845	208.5985	222.3881	208.0395	165.8515	115.1411	64.0945	32.4201	21.0417 (83)
Total gains	589.9307	629.8041	648.2446	692.7488	719.8953	714.5411	679.7562	641.4528	603.8143	569.5193	567.7400	574.7076 (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	74.7356	75.0698	75.4070	77.1395	77.4956	79.3265	79.3265	79.7032	78.5839	77.4956	76.7866	76.0906
alpha	5.9824	6.0047	6.0271	6.1426	6.1664	6.2884	6.2884	6.3135	6.2389	6.1664	6.1191	6.0727
util living area	0.9775	0.9641	0.9369	0.8440	0.6828	0.4784	0.3473	0.3827	0.6072	0.8621	0.9543	0.9798 (86)
MIT	20.3168	20.4417	20.6138	20.8471	20.9640	20.9967	20.9996	20.9993	20.9864	20.8522	20.5806	20.3107 (87)
Th 2	20.3749	20.3775	20.3801	20.3933	20.3959	20.4091	20.4091	20.4117	20.4038	20.3959	20.3906	20.3854 (88)
util rest of house	0.9732	0.9574	0.9253	0.8197	0.6451	0.4352	0.3008	0.3340	0.5587	0.8352	0.9450	0.9760 (89)
MIT 2	19.5756	19.7340	19.9491	20.2363	20.3640	20.4068	20.4089	20.4114	20.3936	20.2483	19.9193	19.5764 (90)
Living area fraction									fLA = Living area / (4) =			0.4500 (91)
MIT	19.9092	20.0525	20.2482	20.5112	20.6340	20.6723	20.6747	20.6760	20.6604	20.5200	20.2169	19.9069 (92)
Temperature adjustment												0.0000
adjusted MIT	19.9092	20.0525	20.2482	20.5112	20.6340	20.6723	20.6747	20.6760	20.6604	20.5200	20.2169	19.9069 (93)
8. Space heating requirement												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9694	0.9535	0.9226	0.8246	0.6602	0.4545	0.3217	0.3559	0.5798	0.8410	0.9419	0.9725 (94)
Useful gains	571.8871	600.5038	598.0894	571.2598	475.2896	324.7808	218.6816	228.3037	350.1077	478.9935	534.7738	558.8762 (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	889.6495	859.7735	776.6063	641.1596	491.0619	326.0615	218.8007	228.5215	355.6007	545.2593	727.6308	879.2757 (97)
Space heating kWh	236.4152	174.2292	132.8166	50.3278	11.7346	0.0000	0.0000	0.0000	0.0000	49.3018	138.8571	238.3772 (98a)
Space heating requirement - total per year (kWh/year)												1032.0595
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	236.4152	174.2292	132.8166	50.3278	11.7346	0.0000	0.0000	0.0000	0.0000	49.3018	138.8571	238.3772 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1032.0595
Space heating per m2										(98c) / (4) =		11.9798 (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												
	236.4152	174.2292	132.8166	50.3278	11.7346	0.0000	0.0000	0.0000	0.0000	49.3018	138.8571	238.3772 (98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												
307a	354.6228	261.3439	199.2249	75.4917	17.6019	0.0000	0.0000	0.0000	0.0000	73.9527	208.2856	357.5658
Space heating requirement	354.6228	261.3439	199.2249	75.4917	17.6019	0.0000	0.0000	0.0000	0.0000	73.9527	208.2856	357.5658 (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												
	253.9543	224.6342	238.8352	215.1744	209.1645	185.2682	177.7455	191.8202	191.9638	216.1133	229.7544	253.3486 (64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50												
310a	380.9315	336.9512	358.2528	322.7616	313.7468	277.9023	266.6182	287.7303	287.9457	324.1700	344.6316	380.0229
Water heating fuel	380.9315	336.9512	358.2528	322.7616	313.7468	277.9023	266.6182	287.7303	287.9457	324.1700	344.6316	380.0229 (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	19.0582	17.2139	19.0582	18.4434	19.0582	18.4434	19.0582	19.0582	18.4434	19.0582	18.4434	19.0582 (331)
Lighting	26.6176	21.3537	19.2266	14.0862	10.8806	8.8896	9.9257	12.9017	16.7581	21.9875	24.8349	27.3574 (332)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333a)m	-4.4865	-7.9582	-14.6677	-20.6193	-25.7510	-25.3862	-24.8558	-21.4034	-16.1076	-10.3707	-5.3855	-3.6632 (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												1548.0893 (307)
Space heating fuel - secondary												0.0000 (309)
Water heating fuel - community heating												3881.6650 (310)
Efficiency of water heater												0.0000 (311)
Electricity used for heat distribution												15.4809 (313)
Space cooling fuel												0.0000 (321)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)												
mechanical ventilation fans (SFP = 0.7625)												224.3949 (330a)
Total electricity for the above, kWh/year												224.3949 (331)
Electricity for lighting (calculated in Appendix L)												214.8196 (332)

Full SAP Calculation Printout



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

PV generation	-180.6553 (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	5688.3135 (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	2340.4113	0.1570	104.7460 (367)
Electrical energy for heat distribution (space & water)	15.4809	0.0000	7.8977 (372)
Overall CO2 factor for heat network			0.0641 (386)
Total CO2 associated with community systems			348.3137 (373)
Space and water heating			348.3137 (376)
Pumps, fans and electric keep-hot	224.3949	0.1387	31.1263 (378)
Energy for lighting	214.8196	0.1443	31.0051 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-180.6553	0.1306	-23.5849
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-23.5849 (380)
Total CO2, kg/year			386.8602 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.4900 (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	2340.4113	1.5811	1055.0676 (467)
Electrical energy for heat distribution (space & water)	15.4809	0.0000	83.5111 (472)
Overall CO2 factor for heat network			0.6783 (486)
Total CO2 associated with community systems			3683.1271 (473)
Space and water heating			3683.1271 (476)
Pumps, fans and electric keep-hot	224.3949	1.5128	339.4646 (478)
Energy for lighting	214.8196	1.5338	329.4975 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-180.6553	1.4823	-267.7783
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-267.7783 (480)
Total Primary energy kWh/year			4084.3110 (483)
Dwelling Primary energy Rate (DPER)			47.4100 (484)

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

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	86.1500 (1b)	x 2.8000 (2b)	= 241.2200 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	86.1500		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	241.2200 (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	3 * 10 = 30.0000 (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) =	30.0000 / (5) = 0.1244 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3744 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3182 (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	0.4057	0.3978	0.3898	0.3500	0.3421	0.3023	0.3023	0.2943	0.3182	0.3421	0.3580	0.3739 (22b)
Effective ac	0.5823	0.5791	0.5760	0.5613	0.5585	0.5457	0.5457	0.5433	0.5506	0.5585	0.5641	0.5699 (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			13.4500	1.1450	15.4008		(27)
External Wall 1	54.8800	13.4500	41.4300	0.1800	7.4574		(29a)
Corridor wall	40.6600	2.4200	38.2400	0.1800	6.8832		(29a)
Total net area of external elements Aum(A, m2)			95.5400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26) ... (30) + (32) =	32.1614		(33)
Main dwelling							
Party Wall 1			27.8600	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							177.9973 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	8.4900	0.0500	0.4245
E4 Jamb	21.6000	0.0500	1.0800
E7 Party floor between dwellings (in blocks of flats)	30.4800	0.0700	2.1336
E7 Party floor between dwellings (in blocks of flats)	29.0400	0.0700	2.0328
E9 Balcony between dwellings, wall insulation continuous	8.7200	0.0200	0.1744
E16 Corner (normal)	5.6000	0.0900	0.5040
E16 Corner (normal)	5.6000	0.0900	0.5040
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)	19.9000	0.0000	0.0000
E3 Sill	4.9900	0.0500	0.2495
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.1868 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	39.3482 (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	46.3530	46.0986	45.8492	44.6779	44.4588	43.4386	43.4386	43.2497	43.8316	44.4588	44.9021	45.3656 (38)
Heat transfer coeff	85.7011	85.4467	85.1974	84.0261	83.8069	82.7868	82.7868	82.5978	83.1797	83.8069	84.2502	84.7137 (39)
Average = Sum(39)m / 12 =												84.0250
HLP	0.9948	0.9918	0.9889	0.9753	0.9728	0.9610	0.9610	0.9588	0.9655	0.9728	0.9779	0.9833 (40)
HLP (average)												0.9753
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

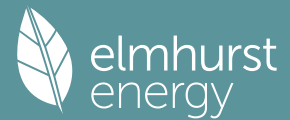
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.5693 (42)
Hot water usage for mixer showers	67.2980	66.2866	64.8129	61.9931	59.9122	57.5916	56.2726	57.7352	59.3385	61.8301	64.7104	67.0402 (42a)	
Hot water usage for baths	29.0636	28.6319	28.0241	26.9034	26.0642	25.1336	24.6310	25.2346	25.8918	26.8875	28.0313	28.9653 (42b)	
Hot water usage for other uses	40.9419	39.4531	37.9643	36.4755	34.9867	33.4979	33.4979	34.9867	36.4755	37.9643	39.4531	40.9419 (42c)	
Average daily hot water use (litres/day)												126.2129 (43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy content (annual)	137.3035	134.3717	130.8013	125.3720	120.9632	116.2232	114.4016	117.9565	121.7058	126.6819	132.1948	136.9474 (44)	
Distribution loss (46)m = 0.15 x (45)m	217.4552	191.3435	201.0368	171.6281	162.8397	142.9100	138.3588	146.0548	150.0754	171.9062	188.3358	214.4265 (45)	
Water storage loss (or HIU loss):										Total = Sum(45)m =		2096.3707	
Store volume	32.6183	28.7015	30.1555	25.7442	24.4259	21.4365	20.7538	21.9082	22.5113	25.7859	28.2504	32.1640 (46)	
a) If manufacturer declared loss factor is known (kWh/day):												180.0000 (47)	
Temperature factor from Table 2b												1.5520 (48)	
Enter (49) or (54) in (55)												0.5400 (49)	
Total storage loss												0.8381 (55)	
If cylinder contains dedicated solar storage	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (56)	
Primary loss	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (57)	
Combi loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)	
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)	
WWHRS	266.6978	235.8208	250.2794	219.2823	212.0823	190.5642	187.6014	195.2975	197.7296	221.1488	235.9900	263.6692 (62)	
PV diverter	-30.7658	-27.2096	-28.4923	-23.5927	-21.9876	-18.8149	-17.6360	-18.7541	-19.4667	-22.9490	-25.9985	-30.1961 (63a)	
Solar input	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)	
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)	
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)	
12Total per year (kWh/year)	235.9320	208.6112	221.7872	195.6895	190.0947	171.7493	169.9654	176.5434	178.2630	198.1998	209.9915	233.4731 (64)	
Electric shower(s)								Total per year (kWh/year) = Sum(64)m =				2390.3001 (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)	
												0.0000 (64a)	
Heat gains from water heating, kWh/month													
	111.6980	99.2035	106.2389	95.1897	93.5383	85.6409	85.3984	87.9574	88.0234	96.5529	100.7450	110.6910 (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	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	122.5838	135.7178	122.5838	126.6699	122.5838	126.6699	122.5838	122.5838	126.6699	122.5838	126.6699	122.5838 (67)

Full SAP Calculation Printout



Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	231.8138	234.2193	228.1576	215.2527	198.9627	183.6524	173.4241	171.0186	177.0804	189.9852	206.2753	221.5856 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464 (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)	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709 (71)
Water heating gains (Table 5)	150.1317	147.6243	142.7942	132.2079	125.7235	118.9457	114.7828	118.2223	122.2548	129.7755	139.9236	148.7782 (72)
Total internal gains	569.0684	582.1005	558.0746	538.6697	511.8091	490.8071	472.3299	473.3638	487.5442	506.8836	537.4079	557.4867 (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				5.9600	11.2829	0.6300	0.7000	0.7700		20.5514 (75)		
Northwest				7.4900	11.2829	0.6300	0.7000	0.7700		25.8271 (81)		
Solar gains	46.3785	94.4047	170.0873	279.3322	375.4773	400.2985	374.4710	298.5327	207.2540	115.3701	58.3561	37.8750 (83)
Total gains	615.4469	676.5052	728.1619	818.0018	887.2864	891.1056	846.8009	771.8964	694.7982	622.2536	595.7640	595.3617 (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	49.7027	49.8506	49.9966	50.6935	50.8261	51.4524	51.4524	51.5700	51.2093	50.8261	50.5586	50.2820
alpha	4.3135	4.3234	4.3331	4.3796	4.3884	4.4302	4.4302	4.4380	4.4140	4.3884	4.3706	4.3521
util living area	0.9849	0.9758	0.9558	0.8907	0.7581	0.5690	0.4243	0.4812	0.7302	0.9221	0.9737	0.9868 (86)
MIT	19.6202	19.8025	20.0967	20.5158	20.8205	20.9615	20.9916	20.9857	20.8878	20.4993	20.0076	19.5985 (87)
Th 2	20.0877	20.0901	20.0926	20.1039	20.1061	20.1160	20.1160	20.1178	20.1122	20.1061	20.1018	20.0972 (88)
util rest of house	0.9815	0.9705	0.9457	0.8664	0.7104	0.4992	0.3417	0.3938	0.6629	0.8994	0.9669	0.9838 (89)
MIT 2	18.4804	18.7127	19.0838	19.6022	19.9461	20.0904	20.1123	20.1111	20.0268	19.5947	18.9826	18.4596 (90)
Living area fraction	18.9934	19.2031	19.5396	20.0134	20.3397	20.4824	20.5080	20.5047	20.4143	20.0018	19.4439	18.9721 (92)
MIT	18.9934	19.2031	19.5396	20.0134	20.3397	20.4824	20.5080	20.5047	20.4143	20.0018	19.4439	18.9721 (92)
Temperature adjustment												0.0000
adjusted MIT	18.9934	19.2031	19.5396	20.0134	20.3397	20.4824	20.5080	20.5047	20.4143	20.0018	19.4439	18.9721 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	600.7756	652.0355	683.2104	706.5064	642.0573	471.2030	320.7009	334.0463	477.4342	557.7380	572.2921	582.8166 (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	1259.2376	1222.1555	1110.9399	933.8124	724.0627	486.9868	323.5323	339.0382	525.2198	787.9348	1039.9747	1251.4023 (97)
Space heating kWh	489.8957	383.1207	318.2307	163.6603	61.0120	0.0000	0.0000	0.0000	0.0000	171.2664	336.7315	497.4278 (98a)
Space heating requirement - total per year (kWh/year)												2421.3451
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	489.8957	383.1207	318.2307	163.6603	61.0120	0.0000	0.0000	0.0000	0.0000	171.2664	336.7315	497.4278 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2421.3451
Space heating per m2										(98c) / (4) =		28.1062 (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)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	489.8957	383.1207	318.2307	163.6603	61.0120	0.0000	0.0000	0.0000	0.0000	171.2664	336.7315	497.4278 (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)	530.7646	415.0820	344.7787	177.3134	66.1019	0.0000	0.0000	0.0000	0.0000	185.5541	364.8228	538.9250 (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	235.9320	208.6112	221.7872	195.6895	190.0947	171.7493	169.9654	176.5434	178.2630	198.1998	209.9915	233.4731 (64)
Efficiency of water heater (217)m	85.6597	85.4043	84.8689	83.6617	81.8147	79.8000	79.8000	79.8000	79.8000	83.7339	85.1130	79.8000 (216)
Fuel for water heating, kWh/month	275.4294	244.2632	261.3292	233.9057	232.3478	215.2247	212.9893	221.2323	223.3872	236.7018	246.7208	272.3922 (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	25.4705	20.4334	18.3980	13.4792	10.4117	8.5064	9.4979	12.3457	16.0359	21.0399	23.7645	26.1784 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												

Full SAP Calculation Printout



(233a)m	-11.3405	-17.4271	-27.2724	-33.4685	-38.6258	-36.9911	-36.5388	-33.2126	-27.8429	-21.0978	-12.9666	-9.6440	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(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	-2.6751	-5.8434	-12.0349	-18.7195	-25.4061	-25.7772	-25.4785	-21.2704	-15.1995	-8.5634	-3.6351	-2.0999	(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												2623.3424	(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												2875.9234	(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)												205.5615	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-473.1311	(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												5317.6962	(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	2623.3424	0.2100	550.9019	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2875.9234	0.2100	603.9439	(264)
Space and water heating			1154.8458	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	205.5615	0.1443	29.6689	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-306.4281	0.1328	-40.7047	
PV Unit electricity exported	-166.7029	0.1249	-20.8184	
Total			-61.5231	(269)
Total CO2, kg/year			1134.9208	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			13.1700	(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	2623.3424	1.1300	2964.3769	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2875.9234	1.1300	3249.7934	(278)
Space and water heating			6214.1704	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	205.5615	1.5338	315.2970	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-306.4281	1.4908	-456.8351	
PV Unit electricity exported	-166.7029	0.4584	-76.4094	
Total			-533.2445	(283)
Total Primary energy kWh/year			6126.3237	(286)
Target Primary Energy Rate (TPER)			71.1100	(287)

Full SAP Calculation Printout



Plot Reference	A 205				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	84 B	DER	4.49	TER	13.17		
Environmental	96 A	% DER < TER				65.91	
CO ₂ Emissions (t/year)	0.34	DFEE	32.57	TFEE	34.51		
Compliance Check	See BREL	% DFEE < TFEE				5.62	
% DPER < TPER	33.33	DPER	47.41	TPER	71.11		
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	86.1500	2.8000	241.2200
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	86.1500		
Dwelling volume			

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (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) =	30.0000 / (5) = 0.1244 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2744 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2332 (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)
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	0.2973	0.2915	0.2857	0.2565	0.2507	0.2216	0.2216	0.2157	0.2332	0.2507	0.2624	0.2740 (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	0.5442	0.5425	0.5408	0.5329	0.5314	0.5245	0.5245	0.5233	0.5272	0.5314	0.5344	0.5375 (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			13.4500	1.1450	15.4008		(27)
External Wall 1	54.8800	13.4500	41.4300	0.1500	6.2145	70.0000	2900.1001 (29a)
Corridor wall	40.6600	2.4200	38.2400	0.1800	6.8832	70.0000	2676.8000 (29a)
Total net area of external elements Aum(A, m ²)			95.5400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	30.9185		(33)
Main dwelling							
Party Wall 1			27.8600	0.0000	0.0000	70.0000	1950.2000 (32)
Party Floor 1			86.1500			40.0000	3446.0000 (32a)
Party Ceiling 1			86.1500			30.0000	2584.5000 (32b)
Internal Wall 1			197.4300			9.0000	1776.8699 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	15334.4700 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							177.9973 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					8.4900	0.0500	0.4245
E4 Jamb					21.6000	0.0400	0.8640

elmhurst
energy

Page 2 of 6

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	53.6101	53.7025	53.7933	54.2241	54.3055	54.6875	54.6875	54.7588	54.5397	54.3055	54.1411	53.9703	
alpha	4.5740	4.5802	4.5862	4.6149	4.6204	4.6458	4.6458	4.6506	4.6360	4.6204	4.6094	4.5980	
util living area	0.9934	0.9895	0.9818	0.9522	0.8760	0.7146	0.5518	0.6094	0.8377	0.9627	0.9881	0.9943 (86)	
MIT	19.5679	19.7182	19.9655	20.3532	20.6984	20.9186	20.9806	20.9698	20.8220	20.3953	19.9289	19.5426 (87)	
Th 2	20.1486	20.1499	20.1513	20.1574	20.1586	20.1640	20.1640	20.1650	20.1619	20.1586	20.1563	20.1538 (88)	
util rest of house	0.9919	0.9870	0.9772	0.9394	0.8420	0.6442	0.4553	0.5119	0.7829	0.9503	0.9849	0.9930 (89)	
MIT 2	18.8304	18.9807	19.2269	19.6105	19.9331	20.1179	20.1568	20.1528	20.0471	19.6564	19.1958	18.8092 (90)	
Living area fraction	fLA = Living area / (4) =												0.4500 (91)
MIT	19.1623	19.3126	19.5593	19.9447	20.2775	20.4783	20.5276	20.5205	20.3958	19.9889	19.5257	19.1393 (92)	
Temperature adjustment													0.0000
adjusted MIT	19.1623	19.3126	19.5593	19.9447	20.2775	20.4783	20.5276	20.5205	20.3958	19.9889	19.5257	19.1393 (93)	

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9895	0.9839	0.9732	0.9356	0.8473	0.6720	0.4983	0.5548	0.7997	0.9472	0.9817	0.9909 (94)
Useful gains	483.8606	521.4806	536.2692	561.6025	534.7565	423.9991	299.2278	309.7098	414.9943	454.1918	462.8792	469.6260 (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	1180.8795	1143.1801	1034.0877	867.6167	672.7971	457.8532	305.9144	320.5226	491.7049	736.4428	977.5983	1179.0726 (97)
Space heating kWh	518.5821	417.7820	370.3769	220.3302	102.7022	0.0000	0.0000	0.0000	0.0000	209.9948	370.5978	527.8283 (98a)
Space heating requirement - total per year (kWh/year)	2738.1943											
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	518.5821	417.7820	370.3769	220.3302	102.7022	0.0000	0.0000	0.0000	0.0000	209.9948	370.5978	527.8283 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2738.1943											
Space heating per m2	(98c) / (4) = 31.7840 (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	732.1600	576.3813	591.1880	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7950	0.8700	0.8329	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	582.0351	501.4595	492.3881	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	685.8205	652.8849	605.7329	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	74.7255	112.6605	84.3286	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	18.6814	28.1651	21.0821	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												67.9286 (107)
Energy for space heating												31.7840 (99)
Energy for space cooling												0.7885 (108)
Total												32.5725 (109)
Fabric Energy Efficiency (DFEE)												32.6 (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	86.1500 (1b)	x 2.8000 (2b)	= 241.2200 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	86.1500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	241.2200 (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	3 * 10 = 30.0000 (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) = 30.0000 / (5) = 0.1244 (8)
Pressure test Yes
Pressure Test Method Blower Door
Measured/design AP50 5.0000 (17)
Infiltration rate 0.3744 (18)
Number of sides sheltered 2 (19)

Shelter factor (20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.3182 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infiltr rate	0.4057	0.3978	0.3898	0.3500	0.3421	0.3023	0.3023	0.2943	0.3182	0.3421	0.3580	0.3739	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)													(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =													(23c)
Effective ac	0.5823	0.5791	0.5760	0.5613	0.5585	0.5457	0.5457	0.5433	0.5506	0.5585	0.5641	0.5699	(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			13.4500	1.1450	15.4008			(27)
External Wall 1	54.8800	13.4500	41.4300	0.1800	7.4574			(29a)
Corridor wall	40.6600	2.4200	38.2400	0.1800	6.8832			(29a)
Total net area of external elements Aum(A, m2)			95.5400					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 32.1614			(33)
Main dwelling								
Party Wall 1			27.8600	0.0000	0.0000			(32)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 177.9973 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	8.4900	0.0500	0.4245	
E4 Jamb	21.6000	0.0500	1.0800	
E7 Party floor between dwellings (in blocks of flats)	30.4800	0.0700	2.1336	
E7 Party floor between dwellings (in blocks of flats)	29.0400	0.0700	2.0328	
E9 Balcony between dwellings, wall insulation continuous	8.7200	0.0200	0.1744	
E16 Corner (normal)	5.6000	0.0900	0.5040	
E16 Corner (normal)	5.6000	0.0900	0.5040	
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)	19.9000	0.0000	0.0000	
E3 Sill	4.9900	0.0500	0.2495	

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 7.1868 (36)

Point Thermal Bridges

Total fabric heat loss (33) + (36) + (36a) = 39.3482 (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	46.3530	46.0986	45.8492	44.6779	44.4588	43.4386	43.4386	43.2497	43.8316	44.4588	44.9021	45.3656	(38)
Heat transfer coeff	85.7011	85.4467	85.1974	84.0261	83.8069	82.7868	82.7868	82.5978	83.1797	83.8069	84.2502	84.7137	(39)
Average = Sum(39)m / 12 =												84.0250	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	0.9948	0.9918	0.9889	0.9753	0.9728	0.9610	0.9610	0.9588	0.9655	0.9728	0.9779	0.9833	(40)
HLP (average)												0.9753	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.5693 (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	29.0636	28.6319	28.0241	26.9034	26.0642	25.1336	24.6310	25.2346	25.8918	26.8875	28.0313	28.9653	(42b)
Hot water usage for other uses	40.9419	39.4531	37.9643	36.4755	34.9867	33.4979	33.4979	34.9867	36.4755	37.9643	39.4531	40.9419	(42c)
Average daily hot water use (litres/day)												64.1664	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	70.0055	68.0851	65.9884	63.3789	61.0509	58.6316	58.1290	60.2213	62.3673	64.8518	67.4844	69.9072	(44)
Energy conte	110.8716	96.9522	101.4218	86.7625	82.1863	72.0944	70.3019	74.5666	76.9051	88.0033	96.1439	109.4578	(45)
Energy content (annual)										Total = Sum(45)m =		1065.6675	

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

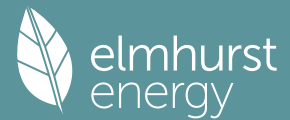
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
WWHRS	94.2408	82.4094	86.2085	73.7482	69.8583	61.2802	59.7566	63.3816	65.3694	74.8028	81.7223	93.0392	(62)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
Output from w/h	94.2408	82.4094	86.2085	73.7482	69.8583	61.2802	59.7566	63.3816	65.3694	74.8028	81.7223	93.0392	(64)
Total per year (kWh/year)												906	(64)

Electric shower(s) 53.8945 48.0204 52.4365 50.0395 50.9785 48.6285 50.2494 50.9785 50.0395 52.4365 51.4505 53.8945 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 613.0466 (64a)

Heat gains from water heating, kWh/month 37.0338 32.6075 34.6612 30.9469 30.2092 27.4772 27.5015 28.5900 28.8522 31.8098 33.2932 36.7334 (65)

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	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637	128.4637 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	122.5838	135.7178	122.5838	126.6699	122.5838	122.5838	122.5838	122.5838	126.6699	122.5838	126.6699	122.5838 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	231.8138	234.2193	228.1576	215.2527	198.9627	183.6524	173.4241	171.0186	177.0804	189.9852	206.2753	221.5856 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464	35.8464 (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)	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709	-102.7709 (71)
Water heating gains (Table 5)	49.7767	48.5230	46.5877	42.9818	40.6038	38.1627	36.9644	38.4274	40.0725	42.7551	46.2406	49.3729 (72)
Total internal gains	465.7134	479.9992	458.8681	446.4436	423.6894	410.0241	394.5114	393.5690	405.3620	416.8633	440.7249	455.0814 (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	5.9600		11.2829		0.6300		0.7000		0.7700		20.5514 (75)	
Northwest	7.4900		11.2829		0.6300		0.7000		0.7700		25.8271 (81)	
Solar gains	46.3785	94.4047	170.0873	279.3322	375.4773	400.2985	374.4710	298.5327	207.2540	115.3701	58.3561	37.8750 (83)
Total gains	512.0919	574.4039	628.9554	725.7758	799.1666	810.3226	768.9825	692.1016	612.6160	532.2333	499.0810	492.9564 (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	49.7027	49.8506	49.9966	50.6935	50.8261	51.4524	51.4524	51.5700	51.2093	50.8261	50.5586	50.2820
alpha	4.3135	4.3234	4.3331	4.3796	4.3884	4.4302	4.4302	4.4380	4.4140	4.3884	4.3706	4.3521
util living area	0.9923	0.9865	0.9729	0.9219	0.8041	0.6156	0.4644	0.5310	0.7878	0.9519	0.9861	0.9935 (86)
MIT	19.4564	19.6460	19.9559	20.4158	20.7700	20.9477	20.9880	20.9790	20.8461	20.3864	19.8598	19.4346 (87)
Th 2	20.0877	20.0901	20.0926	20.1039	20.1061	20.1160	20.1160	20.1178	20.1122	20.1061	20.1018	20.0972 (88)
util rest of house	0.9905	0.9834	0.9663	0.9027	0.7597	0.5433	0.3753	0.4369	0.7245	0.9362	0.9822	0.9920 (89)
MIT 2	18.6732	18.8632	19.1709	19.6229	19.9424	20.0883	20.1118	20.1099	20.0174	19.6043	19.0855	18.6588 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.0257	19.2155	19.5242	19.9797	20.3148	20.4750	20.5061	20.5010	20.3904	19.9563	19.4340	19.0079 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.0257	19.2155	19.5242	19.9797	20.3148	20.4750	20.5061	20.5010	20.3904	19.9563	19.4340	19.0079 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9878	0.9794	0.9611	0.8996	0.7709	0.5736	0.4152	0.4787	0.7459	0.9330	0.9785	0.9895 (94)
Useful gains	505.8221	562.5907	604.4934	652.9352	616.0431	464.7620	319.3023	331.3267	456.9561	496.5956	488.3549	487.7855 (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	1262.0065	1223.2149	1109.6259	930.9869	721.9832	486.3760	323.3765	338.7361	523.2309	784.1214	1039.1387	1254.4346 (97)
Space heating kWh	562.6012	443.9394	375.8186	200.1972	78.8194	0.0000	0.0000	0.0000	0.0000	213.9192	396.5643	570.3869 (98a)
Space heating requirement - total per year (kWh/year)												2842.2463
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	562.6012	443.9394	375.8186	200.1972	78.8194	0.0000	0.0000	0.0000	0.0000	213.9192	396.5643	570.3869 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2842.2463
Space heating per m ²												(98c) / (4) = 32.9918 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	778.1956	612.6221	627.7436	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8681	0.9211	0.8856	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	675.5342	564.2824	555.9226	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	895.2481	849.4596	762.0481	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	158.1940	212.1718	153.3573	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fC = cooled area / (4) =											
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	39.5485	53.0429	38.3393	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												130.9308 (107)
Energy for space heating												32.9918 (99)
Energy for space cooling												1.5198 (108)
Total												34.5116 (109)
Fabric Energy Efficiency (TFEE)												34.5 (109)

