

Summary for Input Data



Plot Reference	A 615		Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	81 B	DER	5.79	TER	15.00
Environmental	95 A	% DER < TER			61.40
CO ₂ Emissions (t/year)	0.38	DFEE	40.34	TFEE	41.17
Compliance Check	See BREL	% DFEE < TFEE			2.02
% DPER < TPER	24.12	DPER	60.95	TPER	80.32

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

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

Orientation	Southwest
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	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	146.72 kJ/m ² K
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	32.85 m	72.81 m ²	2.80 m

8.0 Living Area	35.90 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	49.94	34.47	0.00	None	15.47	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	42.04	39.62	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	7.90	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	152.88

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	72.81	72.81	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	72.81

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 West	2.42	
NE windows	Window	External Wall 1	North East	7.13	
SE windows	Window	External Wall 1	South East	8.34	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	9.84	0.05	0.05	No
E3 Sill	Independently assessed	6.34	0.04	0.04	No
E4 Jamb	Independently assessed	21.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	13.48	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	15.02	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	4.36	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	5.60	0.00	0.00	No
E18 Party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	2.82	0.00	0.00	No
E14 Flat roof	Independently assessed	32.85	0.05	0.05	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	2.82	0.05	0.05	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	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

Summary for Input Data

Number of intermittent extract fans

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Test Method

22.0 Lighting

No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	15.00	1125.00	7

24.0 Main Heating 1

25.0 Main Heating 2

26.0 Heat Networks

Space Community Heating

Distribution Loss

Distribution Loss Value

SAP Code

	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

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower 1	Combi boiler or unvented hot water system	8.00		No	
Shower 2	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Insulation Type

Cylinder Volume L

Loss kWh/day

32.0 Photovoltaic Unit

Export Capable Meter?

Connected To Dwelling

Summary for Input Data



Diverter

No

Battery Capacity [kWh]

0.00

PV Cells kWp

Orientation

Elevation

Overshading

FGHRS

MCS Certificate

**Overshading
Factor**

**MCS
Certificate
Reference**

**Panel
Manufacturer**

0.35

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 615				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	81 B	DER	5.79	TER	15.00		
Environmental	95 A	% DER < TER				61.40	
CO ₂ Emissions (t/year)	0.38	DFEE	40.34	TFEE	41.17		
Compliance Check	See BREL	% DFEE < TFEE				2.02	
% DPER < TPER	24.12	DPER	60.95	TPER	80.32		
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	72.8100 (1b)	2.8000 (2b)	203.8680 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.8100		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	203.8680 (5)

2. Ventilation rate

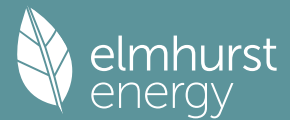
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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			15.4700	1.1450	17.7137		(27)
External Wall 1	49.9400	15.4700	34.4700	0.1500	5.1705	70.0000	2412.8999 (29a)
Corridor wall	42.0400	2.4200	39.6200	0.1900	7.5278	70.0000	2773.4001 (29a)
External Roof 1	72.8100		72.8100	0.1000	7.2810	9.0000	655.2900 (30)
Total net area of external elements Aum(A, m ²)			164.7900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	40.1130		(33)
Main dwelling							
Party Wall 1			7.9000	0.0000	0.0000	70.0000	553.0000 (32)
Party Floor 1			72.8100			40.0000	2912.4000 (32d)
Internal Wall 1			152.8800			9.0000	1375.9200 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	10682.9100 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							146.7231 (35)
List of Thermal Bridges							

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.8400	0.0500	0.4920
E3 Sill	6.3400	0.0400	0.2536
E4 Jamb	21.6000	0.0400	0.8640
E7 Party floor between dwellings (in blocks of flats)	13.4800	0.0500	0.6740
E7 Party floor between dwellings (in blocks of flats)	15.0200	0.0390	0.5858
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0500	0.2180
E16 Corner (normal)	5.6000	0.0500	0.2800
E16 Corner (normal)	5.6000	0.0390	0.2184
E17 Corner (inverted - internal area greater than external area)	5.6000	0.0000	0.0000
E18 Party wall between dwellings	2.8000	0.0390	0.1092
E25 Staggered party wall between dwellings	2.8000	0.0500	0.1400
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	2.8200	0.0000	0.0000
E14 Flat roof	32.8500	0.0500	1.6425
P4 Party wall - Roof (insulation at ceiling level)	2.8200	0.0500	0.1410
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			5.6185 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	45.7315 (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	17.6306	17.4162	17.2017	16.1295	15.9151	14.8429	14.8429	14.6284	15.2718	15.9151	16.3440	16.7729	(38)
Heat transfer coeff	63.3622	63.1477	62.9333	61.8610	61.6466	60.5744	60.5744	60.3599	61.0033	61.6466	62.0755	62.5044	(39)
Average = Sum(39)m / 12 =												61.8074	
HLP	0.8702	0.8673	0.8643	0.8496	0.8467	0.8320	0.8320	0.8290	0.8378	0.8467	0.8526	0.8585	(40)
HLP (average)												0.8489	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3124 (42)
Hot water usage for mixer showers	62.9905	62.0438	60.6644	58.0252	56.0774	53.9054	52.6708	54.0397	55.5404	57.8725	60.5685	62.7491	(42a)
Hot water usage for baths	27.2112	26.8071	26.2380	25.1887	24.4030	23.5317	23.0611	23.6263	24.2416	25.1738	26.2447	27.1192	(42b)
Hot water usage for other uses	38.3110	36.9178	35.5247	34.1316	32.7384	31.3453	31.3453	32.7384	34.1316	35.5247	36.9178	38.3110	(42c)
Average daily hot water use (litres/day)												118.1323	(43)
Daily hot water use	128.5126	125.7687	122.4271	117.3454	113.2188	108.7824	107.0772	110.4044	113.9135	118.5710	123.7310	128.1793	(44)
Energy conte	203.5325	179.0930	188.1659	160.6400	152.4143	133.7607	129.5006	136.7038	140.4668	160.8998	176.2775	200.6977	(45)
Energy content (annual)										Total = Sum(45)m =		1962.1526	
Distribution loss (46)m = 0.15 x (45)m	30.5299	26.8639	28.2249	24.0960	22.8621	20.0641	19.4251	20.5056	21.0700	24.1350	26.4416	30.1047	(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	258.8093	229.0204	243.4427	214.1337	207.6911	187.2544	184.7774	191.9806	193.9605	216.1766	229.7712	255.9745	(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	258.8093	229.0204	243.4427	214.1337	207.6911	187.2544	184.7774	191.9806	193.9605	216.1766	229.7712	255.9745	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2612.9924	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
										Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =		0.0000	(64a)
Heat gains from water heating, kWh/month	111.8960	99.4904	106.7866	96.2077	94.8992	87.2704	87.2804	89.6754	89.5001	97.7206	101.4072	110.9534	(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	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.9786	114.0120	102.9786	106.4112	102.9786	106.4112	102.9786	102.9786	106.4112	102.9786	106.4112	102.9786	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	203.7646	205.8790	200.5507	189.2073	174.8884	161.4306	152.4400	150.3255	155.6538	166.9972	181.3161	194.7739	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	(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)	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	(71)
Water heating gains (Table 5)	150.3979	148.0511	143.5304	133.6219	127.5527	121.2089	117.3124	120.5315	124.3058	131.3449	140.8434	149.1310	(72)
Total internal gains	514.8266	525.6277	504.7452	486.9259	463.1052	446.7362	430.4165	431.5212	444.0563	459.0062	486.2563	504.5690	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
-------	------------	------------------------	--------------------	---------------------	------------------	------------

Full SAP Calculation Printout



												W/m2	or Table 6b	or Table 6c	Table 6d	
Northeast				7.1300		11.2829		0.3500		0.7000		0.7700		13.6588 (75)		
Southeast				8.3400		36.7938		0.3500		0.7000		0.7700		52.1003 (77)		
Solar gains	65.7591	116.5489	171.5181	232.7182	279.1005	285.1918	271.5805	235.7374	192.5167	132.0606	79.5904	55.7414 (83)				
Total gains	580.5856	642.1766	676.2633	719.6441	742.2057	731.9280	701.9969	667.2586	636.5730	591.0668	565.8467	560.3105 (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	46.8336	46.9926	47.1527	47.9700	48.1369	48.9889	48.9889	49.1630	48.6445	48.1369	47.8043	47.4763				
alpha	4.1222	4.1328	4.1435	4.1980	4.2091	4.2659	4.2659	4.2775	4.2430	4.2091	4.1870	4.1651				
util living area	0.9601	0.9391	0.9048	0.8232	0.6923	0.5125	0.3759	0.4103	0.6175	0.8394	0.9337	0.9645	(86)			
MIT	19.8157	20.0208	20.2877	20.6285	20.8583	20.9700	20.9936	20.9908	20.9335	20.6547	20.2047	19.7904	(87)			
Th 2	20.1929	20.1954	20.1979	20.2105	20.2131	20.2257	20.2257	20.2283	20.2207	20.2131	20.2080	20.2030	(88)			
util rest of house	0.9535	0.9293	0.8895	0.7961	0.6495	0.4559	0.3113	0.3439	0.5597	0.8091	0.9215	0.9586	(89)			
MIT 2	18.8167	19.0741	19.4058	19.8234	20.0824	20.2039	20.2225	20.2233	20.1683	19.8635	19.3164	18.7924	(90)			
Living area fraction	fLA = Living area / (4) = 0.4931 (91)															
MIT	19.3093	19.5409	19.8406	20.2204	20.4649	20.5816	20.6027	20.6017	20.5456	20.2536	19.7544	19.2845	(92)			
Temperature adjustment	0.0000															
adjusted MIT	19.3093	19.5409	19.8406	20.2204	20.4649	20.5816	20.6027	20.6017	20.5456	20.2536	19.7544	19.2845	(93)			
8. Space heating requirement																
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
Utilisation	0.9446	0.9199	0.8818	0.7965	0.6636	0.4823	0.3430	0.3763	0.5844	0.8108	0.9134	0.9502	(94)			
Useful gains	548.4469	590.7634	596.2966	573.1620	492.5571	352.9880	240.7515	251.0909	372.0445	479.2214	516.8339	532.3919	(95)			
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)			
Heat loss rate W	951.0206	924.5402	839.5676	700.2891	540.3280	362.3326	242.4603	253.6148	393.2027	595.1104	785.5284	942.8458	(97)			
Space heating kWh	299.5148	224.2980	180.9937	91.5315	35.5416	0.0000	0.0000	0.0000	0.0000	86.2214	193.4600	305.3777	(98a)			
Space heating requirement - total per year (kWh/year)													1416.9388			
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	299.5148	224.2980	180.9937	91.5315	35.5416	0.0000	0.0000	0.0000	0.0000	86.2214	193.4600	305.3777	(98c)			
Space heating requirement after solar contribution - total per year (kWh/year)													1416.9388			
Space heating per m2													(98c) / (4) =	19.4608 (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																
299.5148 224.2980 180.9937 91.5315 35.5416 0.0000 0.0000 0.0000 0.0000 86.2214 193.4600 305.3777 (98)																
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50																
307a 449.2722 336.4471 271.4905 137.2972 53.3124 0.0000 0.0000 0.0000 0.0000 129.3321 290.1900 458.0666																
Space heating requirement																
449.2722 336.4471 271.4905 137.2972 53.3124 0.0000 0.0000 0.0000 0.0000 129.3321 290.1900 458.0666 (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																
258.8093 229.0204 243.4427 214.1337 207.6911 187.2544 184.7774 191.9806 193.9605 216.1766 229.7712 255.9745 (64)																
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50																
310a 388.2140 343.5306 365.1640 321.2005 311.5367 280.8816 277.1662 287.9709 290.9407 324.2649 344.6568 383.9618																
Water heating fuel																
388.2140 343.5306 365.1640 321.2005 311.5367 280.8816 277.1662 287.9709 290.9407 324.2649 344.6568 383.9618 (310)																
Cooling System Energy Efficiency Ratio																
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 (314)																
Pumps and Fa 16.1071 14.5484 16.1071 15.5875 16.1071 15.5875 16.1071 16.1071 15.5875 16.1071 15.5875 16.1071 (331)																
Lighting 22.0484 17.6881 15.9261 11.6682 9.0128 7.3636 8.2218 10.6870 13.8814 18.2131 20.5717 22.6612 (332)																
Electricity generated by PVs (Appendix M) (negative quantity)																
(333a)m -3.8366 -6.8111 -12.5664 -17.6869 -22.1116 -21.8080 -21.3511 -18.3727 -13.8118 -8.8807 -4.6069 -3.1321 (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												2125.4081 (307)				
Space heating fuel - secondary												0.0000 (309)				
Water heating fuel - community heating												3919.4886 (310)				
Efficiency of water heater												0.0000 (311)				
Electricity used for heat distribution												21.2541 (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)												189.6482 (330a)				

Full SAP Calculation Printout



Total electricity for the above, kWh/year	189.6482 (331)
Electricity for lighting (calculated in Appendix L)	177.9434 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-154.9760 (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	6257.5123 (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	2605.5589	0.1559	142.8209 (367)
Electrical energy for heat distribution (space & water)	21.2541	0.0000	8.8346 (372)
Overall CO2 factor for heat network			0.0645 (386)
Total CO2 associated with community systems			389.6365 (373)
Space and water heating			389.6365 (376)
Pumps, fans and electric keep-hot	189.6482	0.1387	26.3065 (378)
Energy for lighting	177.9434	0.1443	25.6827 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-154.9760	0.1305	-20.2294
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-20.2294 (380)
Total CO2, kg/year			421.3964 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.7900 (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	2605.5589	1.5772	1444.8716 (467)
Electrical energy for heat distribution (space & water)	21.2541	0.0000	93.1311 (472)
Overall CO2 factor for heat network			0.6795 (486)
Total CO2 associated with community systems			4107.4022 (473)
Space and water heating			4107.4022 (476)
Pumps, fans and electric keep-hot	189.6482	1.5128	286.8998 (478)
Energy for lighting	177.9434	1.5338	272.9356 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-154.9760	1.4822	-229.7038
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-229.7038 (480)
Total Primary energy kWh/year			4437.5338 (483)
Dwelling Primary energy Rate (DPER)			60.9500 (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	72.8100 (1b)	x 2.8000 (2b)	= 203.8680 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.8100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	203.8680 (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) = 0.1472 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3972 (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) = 0.3376 (21)

Full SAP Calculation Printout



Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate												
Effective ac	0.4304	0.4220	0.4135	0.3713	0.3629	0.3207	0.3207	0.3123	0.3376	0.3629	0.3798	0.3967 (22b)
	0.5926	0.5890	0.5855	0.5689	0.5658	0.5514	0.5514	0.5488	0.5570	0.5658	0.5721	0.5787 (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			15.4700	1.1450	17.7137		(27)
External Wall 1	49.9400	15.4700	34.4700	0.1800	6.2046		(29a)
Corridor wall	42.0400	2.4200	39.6200	0.1800	7.1316		(29a)
External Roof 1	72.8100		72.8100	0.1100	8.0091		(30)
Total net area of external elements Aum(A, m2)			164.7900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	41.4790		(33)
Main dwelling							
Party Wall 1			7.9000	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							146.7231 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.8400	0.0500	0.4920
E3 Sill	6.3400	0.0500	0.3170
E4 Jamb	21.6000	0.0500	1.0800
E7 Party floor between dwellings (in blocks of flats)	13.4800	0.0700	0.9436
E7 Party floor between dwellings (in blocks of flats)	15.0200	0.0700	1.0514
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872
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)	5.6000	-0.0900	-0.5040
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)	2.8200	0.0000	0.0000
E14 Flat roof	32.8500	0.0800	2.6280
P4 Party wall - Roof (insulation at ceiling level)	2.8200	0.1200	0.3384
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.7776 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 49.2566 (37)

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

(38)m	Jan 39.8700	Feb 39.6280	Mar 39.3908	Apr 38.2767	May 38.0682	Jun 37.0979	Jul 37.0979	Aug 36.9182	Sep 37.4717	Oct 38.0682	Nov 38.4899	Dec 38.9308 (38)
Heat transfer coeff	89.1266	88.8846	88.6474	87.5333	87.3249	86.3545	86.3545	86.1748	86.7283	87.3249	87.7466	88.1874 (39)
Average = Sum(39)m / 12 =												87.5323
HLP	Jan 1.2241	Feb 1.2208	Mar 1.2175	Apr 1.2022	May 1.1994	Jun 1.1860	Jul 1.1860	Aug 1.1836	Sep 1.1912	Oct 1.1994	Nov 1.2051	Dec 1.2112 (40)
HLP (average)												1.2022
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.3124 (42)
Hot water usage for mixer showers	62.9905	62.0438	60.6644	58.0252	56.0774	53.9054	52.6708	54.0397	55.5404	57.8725	60.5685	62.7491 (42a)
Hot water usage for baths	27.2112	26.8071	26.2380	25.1887	24.4030	23.5317	23.0611	23.6263	24.2416	25.1738	26.2447	27.1192 (42b)
Hot water usage for other uses	38.3110	36.9178	35.5247	34.1316	32.7384	31.3453	31.3453	32.7384	34.1316	35.5247	36.9178	38.3110 (42c)
Average daily hot water use (litres/day)												118.1323 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	128.5126	125.7687	122.4271	117.3454	113.2188	108.7824	107.0772	110.4044	113.9135	118.5710	123.7310	128.1793 (44)
Distribution loss (46)m = 0.15 x (45)m	203.5325	179.0930	188.1659	160.6400	152.4143	133.7607	129.5006	136.7038	140.4668	160.8998	176.2775	200.6977 (45)
Water storage loss (or HIU loss):	Total = Sum(45)m = 1962.1526											
Store volume	30.5299	26.8639	28.2249	24.0960	22.8621	20.0641	19.4251	20.5056	21.0700	24.1350	26.4416	30.1047 (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	252.7752	223.5702	237.4085	208.2942	201.6570	181.4149	178.7433	185.9464	188.1210	210.1424	223.9317	249.9404 (62)
PV diverter	-28.7966	-25.4680	-26.6686	-22.0826	-20.5802	-17.6106	-16.5072	-17.5537	-18.2206	-21.4801	-24.3344	-28.2633 (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)	223.9786	198.1023	210.7400	186.2115	181.0768	163.8042	162.2361	168.3927	169.9003	188.6623	199.5973	221.6771 (64)
Electric shower(s)	Total per year (kWh/year) = Sum(64)m = 2274.3793 (64)											
	2274 (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	107.0687	95.1302	101.9593	91.5361	90.0719	82.5988	82.4531	84.8481	84.8286	92.8933	96.7356	106.1261 (65)

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

Full SAP Calculation Printout



Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.9786	114.0120	102.9786	106.4112	102.9786	106.4112	102.9786	102.9786	106.4112	102.9786	106.4112	102.9786	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	203.7646	205.8790	200.5507	189.2073	174.8884	161.4306	152.4400	150.3255	155.6538	166.9972	181.3161	194.7739	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	(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)	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	(71)
Water heating gains (Table 5)	143.9095	141.5628	137.0421	127.1335	121.0644	114.7205	110.8241	114.0432	117.8174	124.8566	134.3551	142.6427	(72)
Total internal gains	511.3382	522.1394	501.2569	483.4376	459.6169	440.2479	423.9281	425.0328	437.5680	455.5179	482.7679	501.0807	(73)

6. Solar gains

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

Northeast				7.1300	11.2829	0.6300	0.7000				0.7700	24.5858 (75)
Southeast				8.3400	36.7938	0.6300	0.7000				0.7700	93.7806 (77)

Solar gains	118.3663	209.7881	308.7326	418.8928	502.3808	513.3453	488.8449	424.3273	346.5300	237.7091	143.2628	100.3346 (83)
Total gains	629.7046	731.9274	809.9895	902.3304	961.9977	953.5932	912.7730	849.3602	784.0980	693.2270	626.0307	601.4153 (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	33.2951	33.3857	33.4750	33.9011	33.9820	34.3639	34.3639	34.4355	34.2158	33.9820	33.8187	33.6496		
alpha	3.2197	3.2257	3.2317	3.2601	3.2655	3.2909	3.2909	3.2957	3.2811	3.2655	3.2546	3.2433		
util living area	0.9628	0.9403	0.9031	0.8225	0.6971	0.5348	0.4024	0.4457	0.6546	0.8568	0.9410	0.9674	(86)	
MIT	19.1094	19.4065	19.8108	20.3166	20.6948	20.9075	20.9725	20.9614	20.8158	20.3220	19.6416	19.0649	(87)	
Th 2	19.9008	19.9034	19.9060	19.9182	19.9205	19.9312	19.9312	19.9332	19.9271	19.9205	19.9159	19.9111	(88)	
util rest of house	0.9557	0.9293	0.8850	0.7901	0.6441	0.4590	0.3103	0.3506	0.5805	0.8229	0.9282	0.9611	(89)	
MIT 2	17.7319	18.1047	18.6069	19.2223	19.6486	19.8682	19.9189	19.9145	19.7879	19.2465	18.4136	17.6826	(90)	
Living area fraction										fLA = Living area / (4) =		0.4931	(91)	
MIT	18.4111	18.7466	19.2005	19.7619	20.1644	20.3807	20.4384	20.4307	20.2947	19.7768	19.0191	18.3642	(92)	
Temperature adjustment												0.0000		
adjusted MIT	18.4111	18.7466	19.2005	19.7619	20.1644	20.3807	20.4384	20.4307	20.2947	19.7768	19.0191	18.3642	(93)	

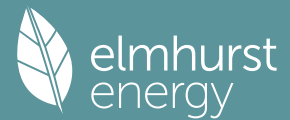
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Useful gains	0.9431	0.9147	0.8712	0.7849	0.6568	0.4919	0.3548	0.3960	0.6074	0.8177	0.9149	0.9493	(94)	
Ext temp.	593.8683	669.4951	705.6936	708.2076	631.8672	469.0450	323.8346	336.3270	476.2412	566.8679	572.7307	570.9062	(95)	
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)	
Space heating kWh	1257.6710	1230.7490	1125.8671	950.7777	739.1559	499.1858	331.4618	347.3418	537.2592	801.3624	1045.8604	1249.1009	(97)	
Space heating requirement - total per year (kWh/year)	493.8692	377.1626	312.6091	174.6505	79.8228	0.0000	0.0000	0.0000	0.0000	174.4640	340.6534	504.5769	(98a)	
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)	
Solar heating contribution - total per year (kWh/year)	493.8692	377.1626	312.6091	174.6505	79.8228	0.0000	0.0000	0.0000	0.0000	174.4640	340.6534	504.5769	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												2457.8085	(98c) / (4) =	
Space heating per m2												33.7565	(99)	

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000	(201)
Fraction of space heat from main system(s)													1.0000	(202)
Efficiency of main space heating system 1 (in %)													92.3000	(206)
Efficiency of main space heating system 2 (in %)													0.0000	(207)
Efficiency of secondary/supplementary heating system, %													0.0000	(208)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Space heating efficiency (main heating system 1)	493.8692	377.1626	312.6091	174.6505	79.8228	0.0000	0.0000	0.0000	0.0000	174.4640	340.6534	504.5769	(98)	
Space heating fuel (main heating system)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000	(210)	
Space heating efficiency (main heating system 2)	535.0695	408.6269	338.6881	189.2205	86.4820	0.0000	0.0000	0.0000	0.0000	189.0184	369.0719	546.6705	(211)	
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)	
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)	
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)	
Water heating requirement	223.9786	198.1023	210.7400	186.2115	181.0768	163.8042	162.2361	168.3927	169.9003	188.6623	199.5973	221.6771	(64)	
Efficiency of water heater (217)m	85.7814	85.4801	84.9424	83.9163	82.3537	79.8000	79.8000	79.8000	79.8000	83.8847	85.2479	85.8448	(216)	
Fuel for water heating, kWh/month	261.1039	231.7525	248.0976	221.9016	219.8770	205.2685	203.3034	211.0184	212.9077	224.9067	234.1375	258.2300	(219)	

Full SAP Calculation Printout



Space cooling fuel requirement														
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	21.3969	17.1654	15.4555	11.3234	8.7465	7.1460	7.9789	10.3712	13.4712	17.6749	19.9638	21.9916	21.9916	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-13.7732	-20.8378	-32.1161	-38.8038	-44.2526	-42.1959	-41.6822	-38.1398	-32.3443	-24.9726	-15.6374	-11.7480	-11.7480	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)														
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)														
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)														
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233b)m	-3.9949	-8.6629	-17.7150	-27.3566	-36.9226	-37.3773	-36.9391	-30.9300	-22.2218	-12.6298	-5.4091	-3.1402	-3.1402	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)														
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)														
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)														
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year														
Space heating fuel - main system 1													2662.8478	(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													2732.5048	(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)													172.6854	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-599.8028	(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													5054.2352	(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	2662.8478	0.2100	559.1980	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2732.5048	0.2100	573.8260	(264)
Space and water heating			1133.0240	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	172.6854	0.1443	24.9238	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-356.5036	0.1331	-47.4634	
PV Unit electricity exported	-243.2992	0.1251	-30.4346	
Total			-77.8980	(269)
Total CO2, kg/year			1091.9791	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.0000	(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	2662.8478	1.1300	3009.0180	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2732.5048	1.1300	3087.7304	(278)
Space and water heating			6096.7484	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	172.6854	1.5338	264.8707	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-356.5036	1.4920	-531.8908	
PV Unit electricity exported	-243.2992	0.4591	-111.7063	
Total			-643.5971	(283)
Total Primary energy kWh/year			5848.1228	(286)
Target Primary Energy Rate (TPER)			80.3200	(287)

Full SAP Calculation Printout



Plot Reference	A 615			Issued on Date	19/03/2026	
Assessment Reference	Be Green		Plot Type Ref			
Plot Address				SAP Version	10.2	
SAP Rating	81 B		DER	5.79	TER	15.00
Environmental	95 A		% DER < TER			61.40
CO ₂ Emissions (t/year)	0.38		DFEE	40.34	TFEE	41.17
Compliance Check	See BREL		% DFEE < TFEE			2.02
% DPER < TPER	24.12		DPER	60.95	TPER	80.32
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			
Ground floor	72.8100 (1b)	2.8000 (2b)	203.8680 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.8100		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	203.8680 (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	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) = 0.1472 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2972 (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) = 0.2526 (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	0.3220	0.3157	0.3094	0.2778	0.2715	0.2400	0.2400	0.2336	0.2526	0.2715	0.2842	0.2968 (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	0.5519	0.5498	0.5479	0.5386	0.5369	0.5288	0.5288	0.5273	0.5319	0.5369	0.5404	0.5440 (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			15.4700	1.1450	17.7137		(27)
External Wall 1	49.9400	15.4700	34.4700	0.1500	5.1705	70.0000	2412.8999 (29a)
Corridor wall	42.0400	2.4200	39.6200	0.1900	7.5278	70.0000	2773.4001 (29a)
External Roof 1	72.8100		72.8100	0.1000	7.2810	9.0000	655.2900 (30)
Total net area of external elements A _{um} (A, m ²)			164.7900				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 40.1130		(33)
Main dwelling							
Party Wall 1			7.9000	0.0000	0.0000	70.0000	553.0000 (32)
Party Floor 1			72.8100			40.0000	2912.4000 (32a)
Internal Wall 1			152.8800			9.0000	1375.9200 (32c)
Heat capacity C _m = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 10682.9100 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							146.7231 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					9.8400	0.0500	0.4920
E3 Sill					6.3400	0.0400	0.2536

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	35.8138	35.8725	35.9301	36.2035	36.2552	36.4974	36.4974	36.5426	36.4037	36.2552	36.1509	36.0425
alpha	3.3876	3.3915	3.3953	3.4136	3.4170	3.4332	3.4332	3.4362	3.4269	3.4170	3.4101	3.4028
util living area	0.9821	0.9717	0.9549	0.9117	0.8291	0.6843	0.5370	0.5831	0.7829	0.9261	0.9711	0.9844 (86)
MIT	18.9920	19.2278	19.5790	20.0738	20.5154	20.8279	20.9445	20.9254	20.7089	20.1448	19.4905	18.9497 (87)
Th 2	19.9699	19.9714	19.9729	19.9799	19.9812	19.9872	19.9872	19.9883	19.9849	19.9812	19.9785	19.9758 (88)
util rest of house	0.9785	0.9660	0.9453	0.8917	0.7880	0.6077	0.4290	0.4759	0.7187	0.9053	0.9643	0.9812 (89)
MIT 2	18.1453	18.3792	18.7260	19.2102	19.6211	19.8876	19.9657	19.9572	19.7985	19.2867	18.6465	18.1076 (90)
Living area fraction									fLA = Living area / (4) =			0.4931 (91)
MIT	18.5628	18.7976	19.1466	19.6360	20.0621	20.3512	20.4483	20.4346	20.2474	19.7098	19.0626	18.5228 (92)
Temperature adjustment												0.0000
adjusted MIT	18.5628	18.7976	19.1466	19.6360	20.0621	20.3512	20.4483	20.4346	20.2474	19.7098	19.0626	18.5228 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9719	0.9577	0.9358	0.8838	0.7916	0.6370	0.4800	0.5254	0.7370	0.8987	0.9565	0.9752 (94)
Useful gains	463.3906	516.7079	539.3166	553.4975	516.6612	411.7694	297.2810	306.1282	405.1733	449.1016	447.8948	446.0601 (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	1181.7896	1149.6518	1044.4827	879.9926	684.4335	467.6130	312.8929	327.6319	501.1062	745.6335	981.9619	1179.2339 (97)
Space heating kWh	534.4888	425.3383	375.8436	235.0765	124.8226	0.0000	0.0000	0.0000	0.0000	220.6197	384.5283	545.4813 (98a)
Space heating requirement - total per year (kWh/year)												2846.1990
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	534.4888	425.3383	375.8436	235.0765	124.8226	0.0000	0.0000	0.0000	0.0000	220.6197	384.5283	545.4813 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2846.1990
Space heating per m2										(98c) / (4) =		39.0908 (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	764.2813	601.6683	617.1651	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7488	0.8227	0.7919	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	572.2752	494.9624	488.7355	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	716.4459	686.7216	645.9597	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	103.8029	142.6688	116.9748	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	25.9507	35.6672	29.2437	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												90.8616 (107)
Energy for space heating												39.0908 (99)
Energy for space cooling												1.2479 (108)
Total												40.3387 (109)
Fabric Energy Efficiency (DFEE)												40.3 (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	72.8100 (1b)	x 2.8000 (2b)	= 203.8680 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	72.8100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	203.8680 (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)

Full SAP Calculation Printout



Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 30.0000 / (5) = 0.1472 (8)
 Pressure Test
 Pressure Test Method
 Measured/design AP50
 Infiltration rate
 Number of sides sheltered

Shelter factor
 Infiltration rate adjusted to include shelter factor (20) = 1 - [0.075 x (19)] = 0.8500 (20)
 (21) = (18) x (20) = 0.3376 (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	0.4304	0.4220	0.4135	0.3713	0.3629	0.3207	0.3207	0.3123	0.3376	0.3629	0.3798	0.3967	(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	0.5926	0.5890	0.5855	0.5689	0.5658	0.5514	0.5514	0.5488	0.5570	0.5658	0.5721	0.5787	(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			15.4700	1.1450	17.7137			(27)
External Wall 1	49.9400	15.4700	34.4700	0.1800	6.2046			(29a)
Corridor wall	42.0400	2.4200	39.6200	0.1800	7.1316			(29a)
External Roof 1	72.8100		72.8100	0.1100	8.0091			(30)
Total net area of external elements Aum(A, m2)			164.7900					(31)
Fabric heat loss, W/K = Sum (A x U)					41.4790			(33)
Main dwelling								
Party Wall 1			7.9000	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							146.7231	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	9.8400	0.0500	0.4920	
E3 Sill	6.3400	0.0500	0.3170	
E4 Jamb	21.6000	0.0500	1.0800	
E7 Party floor between dwellings (in blocks of flats)	13.4800	0.0700	0.9436	
E7 Party floor between dwellings (in blocks of flats)	15.0200	0.0700	1.0514	
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872	
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)	5.6000	-0.0900	-0.5040	
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)	2.8200	0.0000	0.0000	
E14 Flat roof	32.8500	0.0800	2.6280	
P4 Party wall - Roof (insulation at ceiling level)	2.8200	0.1200	0.3384	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				7.7776 (36)
Point Thermal bridges				0.0000 (36a)
Total fabric heat loss				49.2566 (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	39.8700	39.6280	39.3908	38.2767	38.0682	37.0979	37.0979	36.9182	37.4717	38.0682	38.4899	38.9308	(38)
Heat transfer coeff	89.1266	88.8846	88.6474	87.5333	87.3249	86.3545	86.3545	86.1748	86.7283	87.3249	87.7466	88.1874	(39)
Average = Sum(39)m / 12 =												87.5323	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2241	1.2208	1.2175	1.2022	1.1994	1.1860	1.1860	1.1836	1.1912	1.1994	1.2051	1.2112	(40)
HLP (average)												1.2022	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3124 (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													
27.2112 26.8071			26.2380	25.1887	24.4030	23.5317	23.0611	23.6263	24.2416	25.1738	26.2447	27.1192	(42b)
Hot water usage for other uses													
38.3110 36.9178			35.5247	34.1316	32.7384	31.3453	31.3453	32.7384	34.1316	35.5247	36.9178	38.3110	(42c)
Average daily hot water use (litres/day)													60.0572 (43)
Daily hot water use													
65.5221 63.7249			61.7627	59.3202	57.1414	54.8771	54.4065	56.3647	58.3731	60.6985	63.1625	65.4301	(44)
Energy conte 103.7710 90.7434			94.9269	81.2064	76.9233	67.4777	65.7999	69.7913	71.9799	82.3673	89.9866	102.4478	(45)
Energy content (annual)													997.4216
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													
88.2054 77.1319			80.6879	69.0255	65.3848	57.3561	55.9299	59.3226	61.1829	70.0122	76.4886	87.0806	(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													
88.2054 77.1319			80.6879	69.0255	65.3848	57.3561	55.9299	59.3226	61.1829	70.0122	76.4886	87.0806	(64)
Total per year (kWh/year) = Sum(64)m =												847.8084	(64)
												848	(64)

Full SAP Calculation Printout



Electric shower(s)	50.4449	44.9468	49.0802	46.8366	47.7155	45.5159	47.0331	47.7155	46.8366	49.0802	48.1573	50.4449 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												573.8073 (64a)
Heat gains from water heating, kWh/month	34.6626	30.5197	32.4420	28.9655	28.2751	25.7180	25.7408	26.7595	27.0049	29.7731	31.1615	34.3814 (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	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	115.6184	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	102.9786	114.0120	102.9786	106.4112	102.9786	106.4112	102.9786	102.9786	106.4112	102.9786	106.4112	102.9786	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	203.7646	205.8790	200.5507	189.2073	174.8884	161.4306	152.4400	150.3255	155.6538	166.9972	181.3161	194.7739	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	34.5618	(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)	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	-92.4947	(71)
Water heating gains (Table 5)	46.5895	45.4162	43.6049	40.2299	38.0041	35.7195	34.5978	35.9671	37.5068	40.0176	43.2798	46.2115	(72)
Total internal gains	411.0182	422.9927	404.8197	393.5340	373.5566	361.2468	347.7019	346.9567	357.2574	367.6789	388.6927	401.6496	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
Northeast				7.1300	11.2829	0.6300	0.7000			0.7700			24.5858 (75)
Southeast				8.3400	36.7938	0.6300	0.7000			0.7700			93.7806 (77)
Solar gains	118.3663	209.7881	308.7326	418.8928	502.3808	513.3453	488.8449	424.3273	346.5300	237.7091	143.2628	100.3346	(83)
Total gains	529.3845	632.7808	713.5523	812.4267	875.9375	874.5921	836.5467	771.2841	703.7873	605.3880	531.9555	501.9842	(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	33.2951	33.3857	33.4750	33.9011	33.9820	34.3639	34.3639	34.4355	34.2158	33.9820	33.8187	33.6496	
alpha	3.2197	3.2257	3.2317	3.2601	3.2655	3.2909	3.2909	3.2957	3.2811	3.2655	3.2546	3.2433	
util living area	0.9766	0.9586	0.9276	0.8550	0.7358	0.5722	0.4351	0.4844	0.7009	0.8922	0.9610	0.9800	(86)
MIT	18.9179	19.2313	19.6613	20.2142	20.6384	20.8870	20.9654	20.9506	20.7727	20.2060	19.4738	18.8717	(87)
Th 2	19.9008	19.9034	19.9060	19.9182	19.9205	19.9312	19.9312	19.9332	19.9271	19.9205	19.9159	19.9111	(88)
util rest of house	0.9719	0.9504	0.9131	0.8262	0.6846	0.4942	0.3371	0.3834	0.6279	0.8641	0.9519	0.9760	(89)
MIT 2	18.0233	18.3328	18.7534	19.2861	19.6655	19.8702	19.9189	19.9142	19.7899	19.2931	18.5842	17.9849	(90)
Living area fraction	18.4644	18.7758	19.2010	19.7437	20.1452	20.3715	20.4349	20.4252	20.2745	19.7432	19.0229	18.4222	(91)
MIT	18.4644	18.7758	19.2010	19.7437	20.1452	20.3715	20.4349	20.4252	20.2745	19.7432	19.0229	18.4222	(92)
Temperature adjustment	18.4644	18.7758	19.2010	19.7437	20.1452	20.3715	20.4349	20.4252	20.2745	19.7432	19.0229	18.4222	(93)
adjusted MIT	18.4644	18.7758	19.2010	19.7437	20.1452	20.3715	20.4349	20.4252	20.2745	19.7432	19.0229	18.4222	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9637	0.9398	0.9019	0.8210	0.6960	0.5276	0.3843	0.4314	0.6533	0.8587	0.9424	0.9686	(94)
Ext temp.	510.1662	594.7179	643.5394	666.9648	609.6537	461.3993	321.4998	332.7057	459.7546	519.8303	501.2941	486.2127	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Space heating kWh	1262.4280	1233.3468	1125.9138	949.1846	737.4761	498.3976	331.1593	346.8716	535.5037	798.4291	1046.1911	1254.2170	(97)
Space heating requirement - total per year (kWh/year)	559.6828	429.1587	358.8866	203.1983	95.0999	0.0000	0.0000	0.0000	0.0000	207.2775	392.3259	571.3952	(98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)	559.6828	429.1587	358.8866	203.1983	95.0999	0.0000	0.0000	0.0000	0.0000	207.2775	392.3259	571.3952	(98c)
Space heating per m ²	(98c) / (4) =												38.6901 (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	811.7327	639.0236	654.9288	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8344	0.8890	0.8612	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	677.3085	568.1230	564.0432	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	983.1187	940.6670	866.3895	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	220.1834	277.1727	224.9456	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	55.0458	69.2932	56.2364	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement													180.5754 (107)

Full SAP Calculation Printout



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

38.6901 (99)
2.4801 (108)
41.1702 (109)
41.2 (109)