

Summary for Input Data



Plot Reference	A 214	Issued on Date	15/05/2026
Assessment Reference	Be Lean 260515	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	85 B	DER	11.06	TER	12.35
Environmental	91 B	% DER < TER			10.45
CO ₂ Emissions (t/year)	0.76	DFEE	28.95	TFEE	28.84
Compliance Check	See BREL	% DFEE < TFEE			-0.37
% DPER < TPER	2.74	DPER	64.36	TPER	66.17

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

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

Orientation	Northeast
Property Tenture	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Flat, Mid-Terrace
Position of Flat	Mid-floor flat
Which Floor	2
2.0 Number of Storeys	1
3.0 Date Built	2026
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	172.65 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:	30.81 m	74.33 m ²	2.80 m

8.0 Living Area	34.26 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	25.44	14.72	0.00	None	10.72	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	60.83	58.41	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	13.61	0.00	None

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Internal Wall 1	Plasterboard on timber frame	9.00	173.12

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
Party Ceiling 1	Precast concrete planks floor, screed, carpeted	30.00	74.33

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 74.33

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
Windows	Manufacturer	Window	Double Low-E Soft 0.1			0.35		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	North East	2.42	
Windows	Windows	External Wall 1	South West	10.72	

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	6.67	0.05	0.05	No
E4 Jamb	Independently assessed	15.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	11.45	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	43.45	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	6.72	0.05	0.05	No
E16 Corner (normal)	Independently assessed	5.60	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.80	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	0.04	0.04	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	9.72	0.00	0.00	No
E3 Sill	Independently assessed	3.17	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	m ² /(h.m ²) @ 50 Pa			
Test Method	Blower Door				
22.0 Lighting	No				
No Fixed Lighting	No				
	Name Lighting 1	Efficacy 75.00	Power 15.00	Capacity 1125.00	Count 7
24.0 Main Heating 1	Manufacturer				
Percentage of Heat	100.00				%
Fuel Type	Mains gas				
SAP Code	102				
In Winter	88.80				
In Summer	79.80				
Model Name	x				
Manufacturer	x				
Controls SAP Code	2110				
Controls description	Time and temperature zone control by arrangement				
Delayed Start Stat	Yes				
Burner Control	Modulating				
Flue Type	Balanced				
Fan Assisted Flue	Yes				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators				
Flow Temperature	Enter value				
Flow Temperature Value	55.00				
Boiler Interlock	Yes				
25.0 Main Heating 2	None				
26.0 Heat Networks	None				
27.0 Secondary Heating	None				
28.0 Water Heating	Main Heating 1				
Water Heating	Main Heating 1				
SAP Code	901				
Flue Gas Heat Recovery System	No				
Waste Water Heat Recovery Instantaneous System 1	No				
Waste Water Heat Recovery Instantaneous System 2	No				
Waste Water Heat Recovery Storage System	No				
Solar Panel	No				
Water use <= 125 litres/person/day	Yes				
Cold Water Source	From header tank				
Bath Count	1				
28.1 Showers					
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Shower 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					

Summary for Input Data

29.0 Hot Water Cylinder

Cylinder Stat

Hot Water Cylinder

Cylinder In Heated Space

Yes

Independent Time Control

Yes

Insulation Type

Yes

Cylinder Volume

Measured Loss

Loss

180.00

L

Pipes insulation

1.20

kWh/day

Fully insulated primary pipework

31.0 Thermal Store

None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	A 214				Issued on Date	15/05/2026	
Assessment Reference	Be Lean 260515			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	85 B	DER	11.06	TER	12.35		
Environmental	91 B	% DER < TER				10.45	
CO ₂ Emissions (t/year)	0.76	DFEE	28.95	TFEE	28.84		
Compliance Check	See BREL	% DFEE < TFEE				-0.37	
% DPER < TPER	2.74	DPER	64.36	TPER	66.17		
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	74.3300 (1b)	2.8000 (2b)	208.1240 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.3300		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	208.1240 (5)

2. Ventilation rate

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

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) =	0.0000 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	3.0000	(17)
Infiltration rate	0.1500	(18)
Number of sides sheltered	3	(19)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1482	0.1453	0.1424	0.1279	0.1250	0.1104	0.1104	0.1075	0.1162	0.1250	0.1308	0.1366 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2477	0.2448	0.2419	0.2274	0.2245	0.2099	0.2099	0.2070	0.2157	0.2245	0.2303	0.2361 (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)
Windows			10.7200	1.1450	12.2748		(27)
External Wall 1	25.4400	10.7200	14.7200	0.1500	2.2080	70.0000	1030.4000 (29a)
Corridor wall	60.8300	2.4200	58.4100	0.1800	10.5138	70.0000	4088.7000 (29a)
Total net area of external elements Aum(A, m ²)			86.2700				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	27.4166	(33)
Main dwelling							
Party Wall 1			13.6100	0.0000	0.0000	70.0000	952.7000 (32)
Party Floor 1			74.3300			40.0000	2973.2000 (32d)
Party Ceiling 1			74.3300			30.0000	2229.9000 (32b)
Internal Wall 1			173.1200			9.0000	1558.0800 (32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	12832.9800 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K		172.6487 (35)
List of Thermal Bridges		

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	6.6700	0.0500	0.3335
E4 Jamb	15.6000	0.0400	0.6240
E7 Party floor between dwellings (in blocks of flats)	11.4500	0.0500	0.5725
E7 Party floor between dwellings (in blocks of flats)	43.4500	0.0360	1.5642
E9 Balcony between dwellings, wall insulation continuous	6.7200	0.0500	0.3360
E16 Corner (normal)	5.6000	0.0500	0.2800
E16 Corner (normal)	2.8000	0.0360	0.1008
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000
E18 Party wall between dwellings	2.8000	0.0360	0.1008
E25 Staggered party wall between dwellings	2.8000	0.0360	0.1008
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	9.7200	0.0000	0.0000
E3 Sill	3.1700	0.0400	0.1268
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.1394 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	31.5560 (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	17.0136	16.8139	16.6143	15.6163	15.4167	14.4187	14.4187	14.2191	14.8179	15.4167	15.8159	16.2151	(38)
Heat transfer coeff	48.5696	48.3700	48.1704	47.1723	46.9727	45.9747	45.9747	45.7751	46.3739	46.9727	47.3719	47.7711	(39)
Average = Sum(39)m / 12 =												47.1224	
HLP	0.6534	0.6507	0.6481	0.6346	0.6319	0.6185	0.6185	0.6158	0.6239	0.6319	0.6373	0.6427	(40)
HLP (average)												0.6340	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.3465 (42)
Hot water usage for mixer showers	61.9569	61.0083	59.6104	57.4599	55.5332	52.8377	50.7057	53.1981	54.4517	57.1215	59.9018	61.9010 (42a)
Hot water usage for baths	26.8452	26.4400	25.8635	25.0001	24.2220	23.1509	22.3383	23.3320	23.8535	24.9148	26.0182	26.8239 (42b)
Hot water usage for other uses	38.6605	37.2547	35.8488	34.4430	33.0372	31.6313	31.6313	33.0372	34.4430	35.8488	37.2547	38.6605 (42c)
Average daily hot water use (litres/day)												117.1572 (43)
Daily hot water use	127.4626	124.7030	121.3227	116.9031	112.7924	107.6199	104.6753	109.5673	112.7482	117.8851	123.1747	127.3855 (44)
Energy conte	187.6470	165.0073	173.3677	152.7046	145.3444	124.4589	115.6693	128.9627	130.7823	151.9069	166.4748	187.0749 (45)
Energy content (annual)										Total = Sum(45)m =		1829.4006
Distribution loss (46)m = 0.15 x (45)m	28.1470	24.7511	26.0052	22.9057	21.8017	18.6688	17.3504	19.3444	19.6173	22.7860	24.9712	28.0612 (46)
Water storage loss (or HIU loss):												
Store volume												180.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.2000 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.6480 (55)
Total storage loss	20.0880	18.1440	20.0880	19.4400	20.0880	19.4400	20.0880	20.0880	19.4400	20.0880	19.4400	20.0880 (56)
If cylinder contains dedicated solar storage												
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 (57)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
Total heat required for water heating calculated for each month	230.9974	204.1625	216.7181	194.6566	188.6948	166.4109	159.0197	172.3131	172.7343	195.2573	208.4268	230.4253 (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	230.9974	204.1625	216.7181	194.6566	188.6948	166.4109	159.0197	172.3131	172.7343	195.2573	208.4268	230.4253 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2339.8166 (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	97.0729	86.1891	92.3251	84.3359	83.0073	74.9442	73.1404	77.5604	77.0467	85.1894	88.9145	96.8827 (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	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	111.3927	123.3276	111.3927	115.1058	111.3927	115.1058	111.3927	111.3927	115.1058	111.3927	115.1058	111.3927 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	207.1851	209.3351	203.9173	192.3835	177.8242	164.1405	154.9990	152.8490	158.2668	169.8006	184.3599	198.0436 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601 (71)
Water heating gains (Table 5)	130.4744	128.2575	124.0928	117.1332	111.5690	104.0891	98.3069	104.2479	107.0093	114.5018	123.4923	130.2187 (72)
Total internal gains	510.2497	522.1178	500.6004	485.8200	461.9834	441.5329	422.8961	426.6871	438.5794	456.8926	484.1555	500.8525 (73)

6. Solar gains							
[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Southwest	10.7200	36.7938	0.3500	0.7000	0.7700	66.9683	(79)

Full SAP Calculation Printout



Solar gains	66.9683	114.0718	156.0779	193.3881	216.6108	215.0444	207.3258	190.0006	168.9994	126.0736	80.2126	57.3109 (83)
Total gains	577.2180	636.1895	656.6783	679.2082	678.5943	656.5774	630.2219	616.6877	607.5788	582.9662	564.3681	558.1634 (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	73.3940	73.6969	74.0023	75.5680	75.8891	77.5365	77.5365	77.8746	76.8690	75.8891	75.2495	74.6207
alpha	5.8929	5.9131	5.9335	6.0379	6.0593	6.1691	6.1691	6.1916	6.1246	6.0593	6.0166	5.9747
util living area	0.9570	0.9264	0.8808	0.7739	0.6271	0.4464	0.3208	0.3412	0.5217	0.7727	0.9145	0.9622 (86)
MIT	20.4389	20.5890	20.7392	20.9015	20.9754	20.9975	20.9997	20.9996	20.9934	20.9170	20.6899	20.4225 (87)
Th 2	20.3821	20.3845	20.3869	20.3989	20.4013	20.4134	20.4134	20.4158	20.4085	20.4013	20.3965	20.3917 (88)
util rest of house	0.9499	0.9152	0.8636	0.7466	0.5909	0.4061	0.2781	0.2980	0.4786	0.7408	0.9000	0.9558 (89)
MIT 2	19.7342	19.9201	20.1031	20.3000	20.3796	20.4116	20.4132	20.4156	20.4037	20.3214	20.0557	19.7219 (90)
Living area fraction	19.7342	19.9201	20.1031	20.3000	20.3796	20.4116	20.4132	20.4156	20.4037	20.3214	20.0557	19.7219 (90)
MIT	20.0590	20.2284	20.3963	20.5773	20.6542	20.6816	20.6836	20.6848	20.6755	20.5959	20.3480	20.0448 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.9090	20.0784	20.2463	20.4273	20.5042	20.5316	20.5336	20.5348	20.5255	20.4459	20.1980	19.8948 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9435	0.9090	0.8593	0.7479	0.5972	0.4143	0.2869	0.3068	0.4872	0.7432	0.8947	0.9498 (94)
Useful gains	544.6121	578.2824	564.2880	507.9740	405.2709	271.9990	180.7858	189.1817	296.0299	433.2878	504.9679	530.1202 (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	758.1235	734.1799	662.1625	543.7678	413.5582	272.7059	180.8441	189.2691	297.9753	462.4897	620.4779	749.7592 (97)
Space heating kWh	158.8525	104.7631	72.8186	25.7715	6.1658	0.0000	0.0000	0.0000	0.0000	21.7262	83.1672	163.4114 (98a)
Space heating requirement - total per year (kWh/year)												636.6763
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	158.8525	104.7631	72.8186	25.7715	6.1658	0.0000	0.0000	0.0000	0.0000	21.7262	83.1672	163.4114 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												636.6763
Space heating per m2										(98c) / (4) =		8.5655 (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 %)												88.8000 (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	158.8525	104.7631	72.8186	25.7715	6.1658	0.0000	0.0000	0.0000	0.0000	21.7262	83.1672	163.4114 (98)
Space heating efficiency (main heating system 1)	88.8000	88.8000	88.8000	88.8000	88.8000	0.0000	0.0000	0.0000	0.0000	88.8000	88.8000	88.8000 (210)
Space heating fuel (main heating system)	178.8879	117.9765	82.0030	29.0219	6.9434	0.0000	0.0000	0.0000	0.0000	24.4664	93.6567	184.0219 (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												
	230.9974	204.1625	216.7181	194.6566	188.6948	166.4109	159.0197	172.3131	172.7343	195.2573	208.4268	230.4253 (64)
Efficiency of water heater (217)m	83.2375	82.6404	81.8873	80.7569	80.0567	79.8000	79.8000	79.8000	79.8000	80.6181	82.1754	79.8000 (216)
Fuel for water heating, kWh/month	277.5159	247.0493	264.6541	241.0401	235.7014	208.5349	199.2728	215.9312	216.4590	242.2003	253.6363	83.3031 (217)
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	23.7475	21.4493	23.7475	22.9814	23.7475	22.9814	23.7475	23.7475	22.9814	23.7475	22.9814	23.7475 (231)
Lighting	24.0524	19.2957	17.3737	12.7287	9.8320	8.0328	8.9691	11.6584	15.1430	19.8685	22.4414	24.7209 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)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 (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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (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												716.9778 (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												2878.6058 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans:
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)

Full SAP Calculation Printout



mechanical ventilation fans (SFP = 0.7625)	193.6074 (230a)
central heating pump	41.0000 (230c)
main heating flue fan	45.0000 (230e)
Total electricity for the above, kWh/year	279.6074 (231)
Electricity for lighting (calculated in Appendix L)	194.1165 (232)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	0.0000 (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	4069.3075 (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	716.9778	0.2100	150.5653 (261)
Total CO2 associated with community systems			0.0000 (273)
Water heating (other fuel)	2878.6058	0.2100	604.5072 (264)
Space and water heating			755.0726 (265)
Pumps, fans and electric keep-hot	279.6074	0.1387	38.7850 (267)
Energy for lighting	194.1165	0.1443	28.0170 (268)
Total CO2, kg/year			821.8746 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			11.0600 (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	716.9778	1.1300	810.1849 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2878.6058	1.1300	3252.8245 (278)
Space and water heating			4063.0095 (279)
Pumps, fans and electric keep-hot	279.6074	1.5128	422.9900 (281)
Energy for lighting	194.1165	1.5338	297.7424 (282)
Total Primary energy kWh/year			4783.7419 (286)
Dwelling Primary energy Rate (DPER)			64.3600 (287)

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

1. Overall dwelling characteristics

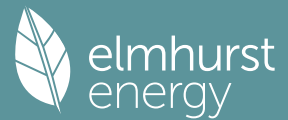
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	74.3300 (1b)	x 2.8000 (2b)	= 208.1240 (1b) - (3b)
Ground floor			(4)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.3300		(5)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 208.1240 (5)

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) = 0.1441 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3941 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.3055 (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	0.3895	0.3818	0.3742	0.3360	0.3284	0.2902	0.2902	0.2826	0.3055	0.3284	0.3436	0.3589 (22b)
Effective ac	0.5758	0.5729	0.5700	0.5565	0.5539	0.5421	0.5421	0.5399	0.5467	0.5539	0.5590	0.5644 (25)

Full SAP Calculation Printout



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			10.7200	1.1450	12.2748			(27)
External Wall 1	25.4400	10.7200	14.7200	0.1800	2.6496			(29a)
Corridor wall	60.8300	2.4200	58.4100	0.1800	10.5138			(29a)
Total net area of external elements Aum(A, m2)			86.2700					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	27.8582		(33)
Main dwelling								
Party Wall 1			13.6100	0.0000	0.0000			(32)

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

172.6487 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	6.6700	0.0500	0.3335
E4 Jamb	15.6000	0.0500	0.7800
E7 Party floor between dwellings (in blocks of flats)	11.4500	0.0700	0.8015
E7 Party floor between dwellings (in blocks of flats)	43.4500	0.0700	3.0415
E9 Balcony between dwellings, wall insulation continuous	6.7200	0.0200	0.1344
E16 Corner (normal)	5.6000	0.0900	0.5040
E16 Corner (normal)	2.8000	0.0900	0.2520
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)	9.7200	0.0000	0.0000
E3 Sill	3.1700	0.0500	0.1585

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

Point Thermal Bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 33.9476 (37)

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

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	39.5493	39.3470	39.1488	38.2176	38.0433	37.2323	37.2323	37.0821	37.5447	38.0433	38.3958	38.7643	(38)
Average = Sum(39)m / 12 =	73.4969	73.2947	73.0964	72.1652	71.9909	71.1799	71.1799	71.0297	71.4923	71.9909	72.3434	72.7119	(39)
												72.1643	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.9888	0.9861	0.9834	0.9709	0.9685	0.9576	0.9576	0.9556	0.9618	0.9685	0.9733	0.9782	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	
												0.9709	
												31	

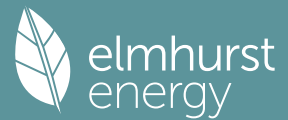
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.3465 (42)
Hot water usage for mixer showers	63.5628	62.6076	61.2156	58.5524	56.5870	54.3952	53.1493	54.5307	56.0450	58.3984	61.1188	63.3193	(42a)
Hot water usage for baths	27.4573	27.0495	26.4753	25.4165	24.6237	23.7446	23.2697	23.8400	24.4608	25.4015	26.4821	27.3645	(42b)
Hot water usage for other uses	38.6605	37.2547	35.8488	34.4430	33.0372	31.6313	31.6313	33.0372	34.4430	35.8488	37.2547	38.6605	(42c)
Average daily hot water use (litres/day)													119.2059 (43)
Daily hot water use	129.6806	126.9118	123.5397	118.4119	114.2478	109.7711	108.0504	111.4079	114.9489	119.6487	124.8556	129.3442	(44)
Energy conte	205.3824	180.7207	189.8760	162.0999	153.7995	134.9763	130.6776	137.9462	141.7434	162.3622	177.8797	202.5218	(45)
Energy content (annual)										Total = Sum(45)m =		1979.9857	
Distribution loss (46)m = 0.15 x (45)m	30.8074	27.1081	28.4814	24.3150	23.0699	20.2464	19.6016	20.6919	21.2615	24.3543	26.6820	30.3783	(46)
Water storage loss (or HIU loss):													
Store volume													180.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.5520 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8381 (55)
Total storage loss	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(56)
If cylinder contains dedicated solar storage	25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	254.6251	225.1979	239.1186	209.7541	203.0422	182.6305	179.9203	187.1889	189.3976	211.6048	225.5339	251.7645	(62)
WVHRS	-29.0583	-25.6994	-26.9109	-22.2833	-20.7672	-17.7707	-16.6572	-17.7132	-18.3862	-21.6753	-24.5555	-28.5201	(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	225.5668	199.4986	212.2078	187.4708	182.2750	164.8599	163.2631	169.4757	171.0114	189.9295	200.9784	223.2444	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2289.7813	(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	107.6838	95.6714	102.5279	92.0216	90.5325	83.0030	82.8444	85.2613	85.2531	93.3796	97.2683	106.7326	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	111.3927	123.3276	111.3927	115.1058	111.3927	115.1058	111.3927	111.3927	115.1058	111.3927	115.1058	111.3927	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	207.1851	209.3351	203.9173	192.3835	177.8242	164.1405	154.9990	152.8490	158.2668	169.8006	184.3599	198.0436	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	(71)
Water heating gains (Table 5)	144.7363	142.3682	137.8063	127.8078	121.6834	115.2819	111.3500	114.5985	118.4070	125.5102	135.0949	143.4579	(72)

Full SAP Calculation Printout



Total internal gains
524.5116 536.2284 514.3138 496.4946 472.0979 452.7257 435.9392 437.0377 449.9771 467.9009 495.7581 514.0917 (73)

6. Solar gains

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

Southwest				10.7200	36.7938		0.6300		0.7000		0.7700	120.5429 (79)
Solar gains	120.5429	205.3292	280.9403	348.0987	389.8995	387.0800	373.1864	342.0011	304.1989	226.9325	144.3826	103.1596 (83)
Total gains	645.0545	741.5576	795.2542	844.5933	861.9974	839.8057	809.1256	779.0388	754.1760	694.8334	640.1407	617.2513 (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	48.5016	48.6354	48.7673	49.3966	49.5162	50.0804	50.0804	50.1863	49.8616	49.5162	49.2749	49.0252
alpha	4.2334	4.2424	4.2512	4.2931	4.3011	4.3387	4.3387	4.3458	4.3241	4.3011	4.2850	4.2683
util living area	0.9677	0.9433	0.9055	0.8243	0.6974	0.5243	0.3832	0.4138	0.6138	0.8404	0.9422	0.9724 (86)
MIT	19.8019	20.0448	20.3241	20.6469	20.8636	20.9695	20.9937	20.9912	20.9392	20.6710	20.1975	19.7625 (87)
Th 2	20.0927	20.0950	20.0972	20.1077	20.1096	20.1188	20.1188	20.1205	20.1153	20.1096	20.1057	20.1015 (88)
util rest of house	0.9613	0.9325	0.8877	0.7931	0.6483	0.4584	0.3082	0.3372	0.5475	0.8053	0.9294	0.9668 (89)
MIT 2	18.7146	19.0180	19.3623	19.7519	19.9903	20.0986	20.1161	20.1164	20.0713	19.7892	19.2205	18.6717 (90)
Living area fraction	fLA = Living area / (4) = 0.4609 (91)											
MIT	19.2158	19.4913	19.8056	20.1644	20.3928	20.5000	20.5206	20.5196	20.4713	20.1957	19.6708	19.1745 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.2158	19.4913	19.8056	20.1644	20.3928	20.5000	20.5206	20.5196	20.4713	20.1957	19.6708	19.1745 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9535	0.9240	0.8813	0.7952	0.6646	0.4874	0.3427	0.3723	0.5750	0.8090	0.9220	0.9596 (94)
Useful gains	615.0653	685.1951	700.8213	671.6600	572.8484	409.3142	277.2562	290.0087	433.6223	562.1131	590.2361	592.2864 (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	1096.2647	1069.4621	972.5901	812.8987	625.8043	419.9599	279.0662	292.6148	455.5002	690.7999	909.4166	1088.8215 (97)
Space heating kWh	358.0123	258.2274	202.1960	101.6919	39.3992	0.0000	0.0000	0.0000	0.0000	95.7429	229.8100	369.4221 (98a)
Space heating requirement - total per year (kWh/year)												1654.5018
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	358.0123	258.2274	202.1960	101.6919	39.3992	0.0000	0.0000	0.0000	0.0000	95.7429	229.8100	369.4221 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1654.5018
Space heating per m2										(98c) / (4) =		22.2589 (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	358.0123	258.2274	202.1960	101.6919	39.3992	0.0000	0.0000	0.0000	0.0000	95.7429	229.8100	369.4221 (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)	387.8790	279.7697	219.0639	110.1754	42.6860	0.0000	0.0000	0.0000	0.0000	103.7302	248.9815	400.2407 (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	225.5668	199.4986	212.2078	187.4708	182.2750	164.8599	163.2631	169.4757	171.0114	189.9295	200.9784	223.2444 (64)
Efficiency of water heater (217)m	85.0907	84.6395	83.9515	82.7494	81.2639	79.8000	79.8000	79.8000	79.8000	82.6059	84.3612	79.8000 (216)
Fuel for water heating, kWh/month	265.0900	235.7039	252.7742	226.5524	224.3002	206.5913	204.5904	212.3755	214.3000	229.9223	238.2356	262.0815 (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	23.1452	18.5679	16.7184	12.2486	9.4612	7.7299	8.6308	11.2186	14.5719	19.1191	21.5950	23.7885 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-14.0603	-21.2700	-32.7755	-39.5890	-45.1346	-43.0304	-42.5096	-38.9083	-33.0076	-25.4913	-15.9638	-11.9934 (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	-4.0786	-8.8466	-18.0958	-27.9526	-37.7353	-38.2040	-37.7530	-31.6034	-22.6976	-12.8961	-5.5220	-3.2056 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												

Full SAP Calculation Printout



(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												1792.5264	(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												2772.5173	(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)												186.7950	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-612.3244	(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												4225.5143	(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	1792.5264	0.2100	376.4305	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2772.5173	0.2100	582.2286	(264)
Space and water heating			958.6592	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	186.7950	0.1443	26.9603	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-363.7338	0.1331	-48.4278	
PV Unit electricity exported	-248.5906	0.1251	-31.0948	
Total			-79.5226	(269)
Total CO2, kg/year			918.0261	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			12.3500	(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	1792.5264	1.1300	2025.5548	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2772.5173	1.1300	3132.9446	(278)
Space and water heating			5158.4993	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	186.7950	1.5338	286.5125	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-363.7338	1.4920	-542.6847	
PV Unit electricity exported	-248.5906	0.4591	-114.1294	
Total			-656.8140	(283)
Total Primary energy kWh/year			4918.2986	(286)
Target Primary Energy Rate (TPER)			66.1700	(287)

Full SAP Calculation Printout



Plot Reference	A 214				Issued on Date	15/05/2026	
Assessment Reference	Be Lean 260515			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	85 B	DER	11.06	TER	12.35		
Environmental	91 B	% DER < TER				10.45	
CO ₂ Emissions (t/year)	0.76	DFEE	28.95	TFEE	28.84		
Compliance Check	See BREL	% DFEE < TFEE				-0.37	
% DPER < TPER	2.74	DPER	64.36	TPER	66.17		
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			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.3300		
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) = 0.1441 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2941 (18)
Number of sides sheltered	3 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.7750 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.2280 (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	0.2907	0.2850	0.2793	0.2508	0.2451	0.2166	0.2166	0.2109	0.2280	0.2451	0.2565	0.2679 (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	0.5422	0.5406	0.5390	0.5314	0.5300	0.5235	0.5235	0.5222	0.5260	0.5300	0.5329	0.5359 (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)
Windows			10.7200	1.1450	12.2748		(27)
External Wall 1	25.4400	10.7200	14.7200	0.1500	2.2080	70.0000	1030.4000 (29a)
Corridor wall	60.8300	2.4200	58.4100	0.1800	10.5138	70.0000	4088.7000 (29a)
Total net area of external elements Aum(A, m ²)			86.2700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	27.4166		(33)
Main dwelling							
Party Wall 1			13.6100	0.0000	0.0000	70.0000	952.7000 (32)
Party Floor 1			74.3300			40.0000	2973.2000 (32d)
Party Ceiling 1			74.3300			30.0000	2229.9000 (32b)
Internal Wall 1			173.1200			9.0000	1558.0800 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	12832.9800 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							172.6487 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					6.6700	0.0500	0.3335
E4 Jamb					15.6000	0.0400	0.6240

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	51.8146	51.8996	51.9832	52.3793	52.4541	52.8051	52.8051	52.8706	52.6694	52.4541	52.3030	52.1460
alpha	4.4543	4.4600	4.4655	4.4920	4.4969	4.5203	4.5203	4.5247	4.5113	4.4969	4.4869	4.4764
util living area	0.9872	0.9774	0.9623	0.9212	0.8379	0.6763	0.5118	0.5468	0.7573	0.9255	0.9761	0.9891 (86)
MIT	19.6541	19.8496	20.1023	20.4492	20.7404	20.9291	20.9839	20.9782	20.8776	20.5144	20.0314	19.6173 (87)
Th 2	20.1458	20.1471	20.1484	20.1543	20.1554	20.1605	20.1605	20.1615	20.1585	20.1554	20.1531	20.1508 (88)
util rest of house	0.9844	0.9726	0.9539	0.9028	0.7991	0.6060	0.4203	0.4554	0.6946	0.9045	0.9701	0.9868 (89)
MIT 2	18.9158	19.1096	19.3588	19.6975	19.9648	20.1208	20.1546	20.1529	20.0833	19.7645	19.2955	18.8832 (90)
Living area fraction	19.2561	19.4507	19.7015	20.0440	20.3223	20.4934	20.5368	20.5333	fLA = Living area / (4) =	20.4494	20.1102	19.6346 (91)
MIT	19.2561	19.4507	19.7015	20.0440	20.3223	20.4934	20.5368	20.5333	20.4494	20.1102	19.6346	19.2215 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2561	19.4507	19.7015	20.0440	20.3223	20.4934	20.5368	20.5333	20.4494	20.1102	19.6346	19.2215 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9807	0.9677	0.9486	0.9000	0.8074	0.6350	0.4621	0.4969	0.7176	0.9032	0.9656	0.9834 (94)
Useful gains	478.9467	530.7565	542.0383	538.5725	485.4535	372.8459	261.0339	272.0811	385.2991	455.6234	463.4608	461.7381 (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	1028.9446	999.4112	905.2855	758.4123	585.9602	397.8457	265.7646	278.6809	429.7366	646.2987	854.2997	1026.8769 (97)
Space heating kWh	409.1985	314.9359	270.2560	158.2847	74.7770	0.0000	0.0000	0.0000	0.0000	141.8624	281.4040	420.4632 (98a)
Space heating requirement - total per year (kWh/year)												2071.1818
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	409.1985	314.9359	270.2560	158.2847	74.7770	0.0000	0.0000	0.0000	0.0000	141.8624	281.4040	420.4632 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2071.1818
Space heating per m2										(98c) / (4) =		27.8647 (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	634.5662	499.5521	512.4177	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8217	0.8928	0.8757	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	521.4512	446.0112	448.7271	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	639.0843	615.5389	597.3853	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	84.6959	126.1286	110.6017	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fC = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	21.1740	31.5321	27.6504	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												80.3565 (107)
Energy for space heating												27.8647 (99)
Energy for space cooling												1.0811 (108)
Total												28.9458 (109)
Fabric Energy Efficiency (DFEE)												28.9 (109)

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

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	74.3300 (1b)	x 2.8000 (2b)	= 208.1240 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.3300		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	208.1240 (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		
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1441 (8)

Full SAP Calculation Printout



Pressure test												Yes	
Pressure Test Method												Blower Door	
Measured/design AP50												5.0000 (17)	
Infiltration rate												0.3941 (18)	
Number of sides sheltered												3 (19)	
Shelter factor	(20) = 1 - [0.075 x (19)] =											0.7750 (20)	
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =											0.3055 (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	0.3895	0.3818	0.3742	0.3360	0.3284	0.2902	0.2902	0.2826	0.3055	0.3284	0.3436	0.3589 (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	0.5758	0.5729	0.5700	0.5565	0.5539	0.5421	0.5421	0.5399	0.5467	0.5539	0.5590	0.5644 (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			10.7200	1.1450	12.2748		(27)
External Wall 1	25.4400	10.7200	14.7200	0.1800	2.6496		(29a)
Corridor wall	60.8300	2.4200	58.4100	0.1800	10.5138		(29a)
Total net area of external elements Aum(A, m2)			86.2700				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		27.8582		(33)
Main dwelling							
Party Wall 1			13.6100	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							172.6487 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				6.6700	0.0500	0.3335	
E4 Jamb				15.6000	0.0500	0.7800	
E7 Party floor between dwellings (in blocks of flats)				11.4500	0.0700	0.8015	
E7 Party floor between dwellings (in blocks of flats)				43.4500	0.0700	3.0415	
E9 Balcony between dwellings, wall insulation continuous				6.7200	0.0200	0.1344	
E16 Corner (normal)				5.6000	0.0900	0.5040	
E16 Corner (normal)				2.8000	0.0900	0.2520	
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)				9.7200	0.0000	0.0000	
E3 Sill				3.1700	0.0500	0.1585	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							6.0894 (36)
Point Thermal bridges						(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =	33.9476 (37)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												
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
Hot water usage for baths	27.4573	27.0495	26.4753	25.4165	24.6237	23.7446	23.2697	23.8400	24.4608	25.4015	26.4821	27.3645
Hot water usage for other uses	38.6605	37.2547	35.8488	34.4430	33.0372	31.6313	31.6313	33.0372	34.4430	35.8488	37.2547	38.6605
Average daily hot water use (litres/day)												
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	66.1178	64.3042	62.3241	59.8595	57.6609	55.3759	54.9011	56.8771	58.9038	61.2503	63.7368	66.0250
Energy content (annual)	104.7145	91.5683	95.7899	81.9447	77.6226	68.0911	66.3981	70.4258	72.6343	83.1161	90.8047	103.3792
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
Water storage loss (or HIU 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
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
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
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
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
Total heat required for water heating calculated for each month	89.0073	77.8331	81.4214	69.6530	65.9792	57.8775	56.4384	59.8619	61.7392	70.6487	77.1840	87.8723
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
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
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
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
Output from w/h	89.0073	77.8331	81.4214	69.6530	65.9792	57.8775	56.4384	59.8619	61.7392	70.6487	77.1840	87.8723
12Total per year (kWh/year)												
Electric shower(s)	50.9032	45.3552	49.5261	47.2622	48.1490	45.9295	47.4605	48.1490	47.2622	49.5261	48.5948	50.9032
Heat gains from water heating, kWh/month	34.9776	30.7971	32.7369	29.2288	28.5321	25.9517	25.9747	27.0027	27.2503	30.0437	31.4447	34.6939

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	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251	117.3251 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	111.3927	123.3276	111.3927	115.1058	111.3927	115.1058	111.3927	111.3927	115.1058	111.3927	115.1058	111.3927 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	207.1851	209.3351	203.9173	192.3835	177.8242	164.1405	154.9990	152.8490	158.2668	169.8006	184.3599	198.0436 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325	34.7325 (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)	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601	-93.8601 (71)
Water heating gains (Table 5)	47.0129	45.8290	44.0012	40.5955	38.3495	36.0441	34.9122	36.2940	37.8477	40.3813	43.6732	46.6316 (72)
Total internal gains	423.7883	436.6892	417.5087	406.2824	385.7640	373.4879	359.5014	358.7332	369.4178	379.7721	401.3364	414.2654 (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	
Southwest	10.7200		36.7938		0.6300		0.7000		0.7700		120.5429 (79)	
Solar gains	120.5429	205.3292	280.9403	348.0987	389.8995	387.0800	373.1864	342.0011	304.1989	226.9325	144.3826	103.1596 (83)
Total gains	544.3312	642.0183	698.4490	754.3810	775.6635	760.5679	732.6878	700.7343	673.6167	606.7046	545.7190	517.4250 (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	48.5016	48.6354	48.7673	49.3966	49.5162	50.0804	50.0804	50.1863	49.8616	49.5162	49.2749	49.0252
alpha	4.2334	4.2424	4.2512	4.2931	4.3011	4.3387	4.3387	4.3458	4.3241	4.3011	4.2850	4.2683
util living area	0.9819	0.9641	0.9348	0.8652	0.7474	0.5712	0.4213	0.4571	0.6694	0.8858	0.9653	0.9851 (86)
MIT	19.6237	19.8847	20.1905	20.5601	20.8207	20.9577	20.9909	20.9871	20.9152	20.5781	20.0452	19.5823 (87)
Th 2	20.0927	20.0950	20.0972	20.1077	20.1096	20.1188	20.1188	20.1205	20.1153	20.1096	20.1057	20.1015 (88)
util rest of house	0.9781	0.9567	0.9213	0.8382	0.6998	0.5019	0.3397	0.3737	0.6019	0.8569	0.9569	0.9819 (89)
MIT 2	18.8446	19.1021	19.4002	19.7555	19.9847	20.0965	20.1157	20.1157	20.0661	19.7808	19.2708	18.8106 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.2037	19.4628	19.7644	20.1264	20.3700	20.4934	20.5191	20.5173	20.4575	20.1483	19.6277	19.1663 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.2037	19.4628	19.7644	20.1264	20.3700	20.4934	20.5191	20.5173	20.4575	20.1483	19.6277	19.1663 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9733	0.9504	0.9156	0.8388	0.7144	0.5320	0.3771	0.4118	0.6291	0.8583	0.9514	0.9776 (94)
Useful gains	529.7726	610.1959	639.4805	632.7893	554.1650	404.6426	276.3269	288.5961	423.7500	520.7277	519.2021	505.8314 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1095.3747	1067.3742	969.5829	810.1527	624.1607	419.4944	278.9595	292.4540	454.5095	687.3897	906.2982	1088.2252 (97)
Space heating kWh	420.8079	307.2238	245.5962	127.7016	52.0768	0.0000	0.0000	0.0000	0.0000	123.9965	278.7092	433.3010 (98a)
Space heating requirement - total per year (kWh/year)												1989.4130
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	420.8079	307.2238	245.5962	127.7016	52.0768	0.0000	0.0000	0.0000	0.0000	123.9965	278.7092	433.3010 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1989.4130
Space heating per m ²												(98c) / (4) = 26.7646 (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	669.0908	526.7310	539.8255	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8927	0.9402	0.9266	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	597.2891	495.2372	500.2232	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	841.5630	811.3327	776.2130	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	175.8772	235.1751	205.3364	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 (105)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	43.9693	58.7938	51.3341	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												154.0972 (107)
Energy for space heating												26.7646 (99)
Energy for space cooling												2.0731 (108)
Total												28.8378 (109)
Fabric Energy Efficiency (TFEE)												28.8 (109)

