

Summary for Input Data



Plot Reference	B 1506	Issued on Date	19/03/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	84 B	DER	14.45	TER	15.50
Environmental	89 B	% DER < TER			6.77
CO ₂ Emissions (t/year)	0.82	DFEE	38.64	TFEE	36.60
Compliance Check	See BREL	% DFEE < TFEE			-5.58
% DPER < TPER	2.47	DPER	82.57	TPER	84.66

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, Semi-Detached
Position of Flat	Top-floor flat
Which Floor	15
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	0.00 kJ/m ² K
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
		25.58 m	61.68 m ²	2.50 m

8.0 Living Area	32.15 m ²
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9.0 External Walls	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	39.23	19.67	0.00	None	19.56	Enter Gross Area
	Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	24.73	22.31	0.70	Stairwell Access Corridor 3	2.42	Enter Gross Area

9.1 Party Walls	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	16.88	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Internal Wall 1	Plasterboard on timber frame	9.00	126.53

10.0 External Roofs	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	61.68	61.68	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	61.68

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double Low-E Soft 0.1			0.35		0.70	1.20
Door	Manufacturer	Door to Corridor				0.00			1.00

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	North East	2.42	
NW windows	Windows	External Wall 1	North West	9.77	
SW windows	Windows	External Wall 1	South West	9.79	

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	9.16	0.05	0.05	No
E4 Jamb	Independently assessed	28.80	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	12.29	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	9.89	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	3.40	0.05	0.05	No
E16 Corner (normal)	Independently assessed	5.00	0.05	0.05	No
E16 Corner (normal)	Independently assessed	2.50	0.04	0.04	No
E18 Party wall between dwellings	Independently assessed	2.50	0.05	0.05	No
E25 Staggered party wall between dwellings	Independently assessed	2.50	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	6.75	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	6.75	0.05	0.05	No
E14 Flat roof	Independently assessed	25.58	0.05	0.05	No

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500625
Configuration	1
Manufacturer SFP	0.63
Duct Type	Rigid
MVHR Efficiency	90.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
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 ³ /(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				
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	Combi boiler or unvented hot water system	8.00		No	
28.3 Waste Water Heat Recovery System					
29.0 Hot Water Cylinder	Hot Water Cylinder				
Cylinder Stat	Yes				

Summary for Input Data

Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	180.00	L
Loss	1.20	kWh/day
Pipes insulation	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



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Compliance Check	See BREL	% DFEE < TFEE	-5.58
% DPER < TPER	2.47	DPER	82.57
		TPER	84.66
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	61.6800 (1b)	2.5000 (2b)	154.2000 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.6800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	154.2000 (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) =												81.0000 (23c)
Effective ac	0.2576	0.2544	0.2512	0.2352	0.2321	0.2161	0.2161	0.2129	0.2225	0.2321	0.2384	0.2448 (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							
Windows			19.5600	1.1450	22.3969		(27)
Door			2.4200	1.0000	2.4200		(26)
External Wall 1	39.2300	19.5600	19.6700	0.1500	2.9505	70.0000	1376.9000 (29a)
Corridor wall	24.7300	2.4200	22.3100	0.1900	4.2389	70.0000	1561.7000 (29a)
External Roof 1	61.6800		61.6800	0.1000	6.1680	9.0000	555.1200 (30)
Total net area of external elements Aum(A, m ²)			125.6400				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		38.1743		(33)
Main dwelling							
Party Wall 1			16.8800	0.0000	0.0000	70.0000	1181.5999 (32)
Party Floor 1			61.6800			40.0000	2467.2000 (32d)
Internal Wall 1			126.5300			9.0000	1138.7700 (32c)
Heat capacity Cm = Sum(A x k)					(28)...(30) + (32) + (32a)...(32e) =		8281.2899 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							134.2622 (35)
List of Thermal Bridges							

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	9.1600	0.0500	0.4580
E4 Jamb	28.8000	0.0400	1.1520
E7 Party floor between dwellings (in blocks of flats)	12.2900	0.0500	0.6145
E7 Party floor between dwellings (in blocks of flats)	9.8900	0.0390	0.3857
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0500	0.1700
E16 Corner (normal)	5.0000	0.0500	0.2500
E16 Corner (normal)	2.5000	0.0390	0.0975
E18 Party wall between dwellings	2.5000	0.0500	0.1250
E25 Staggered party wall between dwellings	2.5000	0.0390	0.0975
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	6.7500	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	6.7500	0.0500	0.3375
E14 Flat roof	25.5800	0.0500	1.2790
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.9667 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	43.1411 (37)

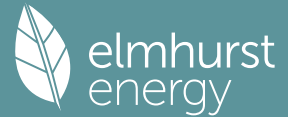
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	13.1063	12.9441	12.7819	11.9709	11.8087	10.9977	10.9977	10.8355	11.3221	11.8087	12.1331	12.4575	(38)
Heat transfer coeff	56.2474	56.0852	55.9230	55.1120	54.9498	54.1388	54.1388	53.9766	54.4632	54.9498	55.2742	55.5986	(39)
Average = Sum(39)m / 12 =												55.0714	
HLP	0.9119	0.9093	0.9067	0.8935	0.8909	0.8777	0.8777	0.8751	0.8830	0.8909	0.8961	0.9014	(40)
HLP (average)												0.8929	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)													
Assumed occupancy													2.0287 (42)
Hot water usage for mixer showers	56.7632	55.8941	54.6134	52.6432	50.8780	48.4084	46.4551	48.7386	49.8871	52.3331	54.8804	56.7120	(42a)
Hot water usage for baths	24.6049	24.2335	23.7051	22.9138	22.2007	21.2190	20.4742	21.3849	21.8629	22.8356	23.8470	24.5854	(42b)
Hot water usage for other uses	35.4061	34.1186	32.8311	31.5436	30.2561	28.9686	28.9686	30.2561	31.5436	32.8311	34.1186	35.4061	(42c)
Average daily hot water use (litres/day)												107.3332	(43)
Daily hot water use	116.7742	114.2462	111.1496	107.1006	103.3347	98.5959	95.8979	100.3796	103.2936	107.9998	112.8459	116.7035	(44)
Energy conte	171.9117	151.1708	158.8305	139.9002	133.1572	114.0229	105.9700	118.1486	119.8154	139.1687	152.5150	171.3876	(45)
Energy content (annual)										Total = Sum(45)m =		1675.9987	
Distribution loss (46)m = 0.15 x (45)m	25.7868	22.6756	23.8246	20.9850	19.9736	17.1034	15.8955	17.7223	17.9723	20.8753	22.8773	25.7081	(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	215.2621	190.3260	202.1809	181.8522	176.5076	155.9749	149.3204	161.4990	161.7674	182.5191	194.4670	214.7380	(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	215.2621	190.3260	202.1809	181.8522	176.5076	155.9749	149.3204	161.4990	161.7674	182.5191	194.4670	214.7380	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2186.4147	(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	91.8410	81.5885	87.4915	80.0784	78.9551	71.4742	69.9153	73.9647	73.4002	80.9539	84.2729	91.6667	(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	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	89.3585	98.9326	89.3585	92.3371	89.3585	92.3371	89.3585	89.3585	92.3371	89.3585	92.3371	89.3585	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	177.1632	179.0016	174.3689	164.5064	152.0568	140.3559	132.5390	130.7006	135.3333	145.1958	157.6454	169.3463	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	(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)	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	(71)
Water heating gains (Table 5)	123.4422	121.4114	117.5960	111.2200	106.1225	99.2697	93.9722	99.4150	101.9447	108.8090	117.0456	123.2079	(72)
Total internal gains	446.3945	455.7763	437.7541	424.4942	403.9684	385.3934	369.3004	372.9047	383.0458	399.7940	423.4588	438.3434	(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	9.7900	36.7938	0.3500	0.7000	0.7700	61.1585 (79)
Northwest	9.7700	11.2829	0.3500	0.7000	0.7700	18.7161 (81)

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Solar gains	79.8747	142.2728	211.1767	289.3361	349.3437	357.9299	340.4581	293.9909	237.9759	161.6941	96.8036	67.6235 (83)
Total gains	526.2692	598.0491	648.9308	713.8303	753.3121	743.3233	709.7585	666.8956	621.0217	561.4880	520.2624	505.9669 (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	40.8972	41.0154	41.1344	41.7397	41.8629	42.4900	42.4900	42.6177	42.2369	41.8629	41.6172	41.3744
alpha	3.7265	3.7344	3.7423	3.7826	3.7909	3.8327	3.8327	3.8412	3.8158	3.7909	3.7745	3.7583
util living area	0.9457	0.9155	0.8670	0.7632	0.6190	0.4524	0.3322	0.3670	0.5665	0.7982	0.9122	0.9516 (86)
MIT	19.7006	19.9532	20.2683	20.6388	20.8676	20.9697	20.9928	20.9895	20.9289	20.6348	20.1316	19.6640 (87)
Th 2	20.1574	20.1596	20.1618	20.1730	20.1753	20.1865	20.1865	20.1887	20.1820	20.1753	20.1708	20.1663 (88)
util rest of house	0.9374	0.9033	0.8483	0.7328	0.5759	0.3991	0.2722	0.3044	0.5096	0.7648	0.8976	0.9442 (89)
MIT 2	18.6524	18.9669	19.3543	19.8003	20.0540	20.1644	20.1827	20.1829	20.1257	19.8077	19.2014	18.6133 (90)
Living area fraction	19.1987	19.4810	19.8307	20.2373	20.4781	20.5842	20.6050	20.6033	20.5444	20.2388	19.6862	0.5212 (91)
MIT	19.1987	19.4810	19.8307	20.2373	20.4781	20.5842	20.6050	20.6033	20.5444	20.2388	19.6862	19.1610 (92)
Temperature adjustment												-0.1500
adjusted MIT	19.0487	19.3310	19.6807	20.0873	20.3281	20.4342	20.4550	20.4533	20.3944	20.0888	19.5362	19.0110 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9241	0.8892	0.8362	0.7295	0.5841	0.4156	0.2921	0.3250	0.5248	0.7610	0.8845	0.9314 (94)
Useful gains	486.3276	531.7896	542.6671	520.7229	440.0288	308.9097	207.3473	216.7431	325.9370	427.3004	460.1715	471.2701 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	14.6000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	829.5782	809.3665	737.1057	616.5556	474.1100	315.8543	208.7028	218.7850	342.8111	521.4083	687.4034	823.4690 (97)
Space heating kWh	255.3785	186.5317	144.6623	68.9996	25.3564	0.0000	0.0000	0.0000	0.0000	70.0163	163.6069	262.0360 (98a)
Space heating requirement - total per year (kWh/year)												1176.5877
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	255.3785	186.5317	144.6623	68.9996	25.3564	0.0000	0.0000	0.0000	0.0000	70.0163	163.6069	262.0360 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1176.5877
Space heating per m2										(98c) / (4) =		19.0757 (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	255.3785	186.5317	144.6623	68.9996	25.3564	0.0000	0.0000	0.0000	0.0000	70.0163	163.6069	262.0360 (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)	287.5884	210.0582	162.9079	77.7022	28.5545	0.0000	0.0000	0.0000	0.0000	78.8472	184.2420	295.0856 (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	215.2621	190.3260	202.1809	181.8522	176.5076	155.9749	149.3204	161.4990	161.7674	182.5191	194.4670	214.7380 (64)
Efficiency of water heater (217)m	84.4440	84.0146	83.3222	82.0884	80.8290	79.8000	79.8000	79.8000	79.8000	82.1072	83.6748	79.8000 (216)
Fuel for water heating, kWh/month	254.9170	226.5392	242.6495	221.5320	218.3716	195.4573	187.1183	202.3797	202.7160	222.2936	232.4080	254.1058 (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	19.8865	17.9620	19.8865	19.2450	19.8865	19.2450	19.8865	19.8865	19.2450	19.8865	19.2450	19.8865 (231)
Lighting	18.9970	15.2401	13.7220	10.0534	7.7655	6.3445	7.0839	9.2080	11.9603	15.6925	17.7247	19.5250 (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												1324.9861 (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												2660.4880 (219)
Space cooling fuel												0.0000 (221)

Electricity for pumps and fans:

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(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7875)			
mechanical ventilation fans (SFP = 0.7875)			148.1477 (230a)
central heating pump			41.0000 (230c)
main heating flue fan			45.0000 (230e)
Total electricity for the above, kWh/year			234.1477 (231)
Electricity for lighting (calculated in Appendix L)			153.3169 (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			4372.9387 (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	1324.9861	0.2100	278.2471 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2660.4880	0.2100	558.7025 (264)
Space and water heating			836.9496 (265)
Pumps, fans and electric keep-hot	234.1477	0.1387	32.4792 (267)
Energy for lighting	153.3169	0.1443	22.1284 (268)
Total CO2, kg/year			891.5571 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			14.4500 (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	1324.9861	1.1300	1497.2343 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2660.4880	1.1300	3006.3515 (278)
Space and water heating			4503.5858 (279)
Pumps, fans and electric keep-hot	234.1477	1.5128	354.2186 (281)
Energy for lighting	153.3169	1.5338	235.1625 (282)
Total Primary energy kWh/year			5092.9669 (286)
Dwelling Primary energy Rate (DPER)			82.5700 (287)

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

1. Overall dwelling characteristics

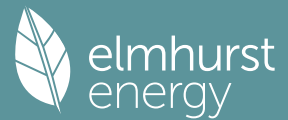
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	61.6800 (1b)	x 2.5000 (2b)	= 154.2000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.6800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 154.2000 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans	(6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(7a)+(7b)+(7c) = 20.0000 / (5) = 0.1297 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3797 (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) = 0.3227 (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	0.4115	0.4034	0.3954	0.3550	0.3470	0.3066	0.3066	0.2985	0.3227	0.3470	0.3631	0.3792 (22b)
Effective ac	0.5847	0.5814	0.5782	0.5630	0.5602	0.5470	0.5470	0.5446	0.5521	0.5602	0.5659	0.5719 (25)

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3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.4200	1.0000	2.4200			(26)
TER Opening Type			13.0000	1.1450	14.8855			(27)
External Wall 1	39.2300	13.0000	26.2300	0.1800	4.7214			(29a)
Corridor wall	24.7300	2.4200	22.3100	0.1800	4.0158			(29a)
External Roof 1	61.6800		61.6800	0.1100	6.7848			(30)
Total net area of external elements Aum(A, m2)			125.6400					(31)
Fabric heat loss, W/K = Sum (A x U)								(33)
Main dwelling								
Party Wall 1			16.8800	0.0000	0.0000			(32)

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

134.2622 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element	9.1600	0.0500	0.4580	
E1 Steel lintel with perforated steel base plate	28.8000	0.0500	1.4400	
E4 Jamb	12.2900	0.0700	0.8603	
E7 Party floor between dwellings (in blocks of flats)	9.8900	0.0700	0.6923	
E7 Party floor between dwellings (in blocks of flats)	3.4000	0.0200	0.0680	
E9 Balcony between dwellings, wall insulation continuous	5.0000	0.0900	0.4500	
E16 Corner (normal)	2.5000	0.0900	0.2250	
E16 Corner (normal)	2.5000	0.0600	0.1500	
E18 Party wall between dwellings	2.5000	0.0600	0.1500	
E25 Staggered party wall between dwellings	6.7500	0.0000	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	6.7500	0.1200	0.8100	
P4 Party wall - Roof (insulation at ceiling level)	25.5800	0.0800	2.0464	
E14 Flat roof				
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				7.3500 (36)
Point Thermal Bridges				0.0000 (36a)
Total fabric heat loss				40.1775 (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	29.7514	29.5841	29.4201	28.6498	28.5057	27.8349	27.8349	27.7106	28.0933	28.5057	28.7973	29.1020	(38)
Heat transfer coeff	69.9289	69.7616	69.5976	68.8273	68.6832	68.0124	68.0124	67.8881	68.2708	68.6832	68.9748	69.2795	(39)
Average = Sum(39)m / 12 =												68.8266	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1337	1.1310	1.1284	1.1159	1.1135	1.1027	1.1027	1.1007	1.1069	1.1135	1.1183	1.1232	(40)
HLP (average)												1.1159	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.0287 (42)
Hot water usage for mixer showers	58.2345	57.3593	56.0840	53.6440	51.8434	49.8353	48.6939	49.9595	51.3469	53.5030	55.9954	58.0113	(42a)
Hot water usage for baths	25.1659	24.7922	24.2659	23.2954	22.5688	21.7631	21.3278	21.8505	22.4195	23.2817	24.2721	25.0809	(42b)
Hot water usage for other uses	35.4061	34.1186	32.8311	31.5436	30.2561	28.9686	28.9686	30.2561	31.5436	32.8311	34.1186	35.4061	(42c)
Average daily hot water use (litres/day)												109.2103	(43)
Daily hot water use	118.8065	116.2701	113.1810	108.4831	104.6683	100.5670	98.9904	102.0661	105.3100	109.6157	114.3860	118.4983	(44)
Energy conte	188.1604	165.5670	173.9550	148.5079	140.9036	123.6588	119.7203	126.3792	129.8578	148.7475	162.9639	185.5396	(45)
Energy content (annual)										Total = Sum(45)m =		1813.9610	
Distribution loss (46)m = 0.15 x (45)m	28.2241	24.8351	26.0932	22.2762	21.1355	18.5488	17.9580	18.9569	19.4787	22.3121	24.4446	27.8309	(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	237.4031	210.0443	223.1976	196.1621	190.1463	171.3130	168.9629	175.6218	177.5120	197.9902	210.6181	234.7823	(62)
WWHRS	-26.6224	-23.5450	-24.6550	-20.4153	-19.0263	-16.2810	-15.2608	-16.2284	-16.8449	-19.8583	-22.4971	-26.1294	(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	210.7807	186.4992	198.5426	175.7468	171.1199	155.0320	153.7021	159.3935	160.6670	178.1319	188.1210	208.6530	(64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2146.3899	(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	101.9575	90.6328	97.2342	87.5022	86.2446	79.2399	79.2011	81.4152	81.3011	88.8527	92.3089	101.0861	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	89.5812	99.1791	89.5812	92.5672	89.5812	92.5672	89.5812	89.5812	92.5672	89.5812	92.5672	89.5812	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	177.1632	179.0016	174.3689	164.5064	152.0568	140.3559	132.5390	130.7006	135.3333	145.1958	157.6454	169.3463	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	(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)	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	(71)

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Water heating gains (Table 5)	137.0396	134.8703	130.6911	121.5309	115.9201	110.0554	106.4531	109.4290	112.9181	119.4256	128.2067	135.8684 (72)
Total internal gains	460.2147	469.4817	451.0718	435.0352	413.9888	396.4092	382.0040	383.1415	394.2493	410.6333	434.8500	451.2265 (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				6.5100	36.7938	0.6300	0.7000	0.7700	73.2028 (79)			
Northwest				6.4900	11.2829	0.6300	0.7000	0.7700	22.3789 (81)			
Solar gains	95.5817	170.2444	252.6802	346.1776	417.9549	428.2196	407.3199	351.7394	284.7386	193.4799	115.8386	80.9221 (83)
Total gains	555.7964	639.7261	703.7520	781.2127	831.9437	824.6288	789.3239	734.8809	678.9879	604.1132	550.6886	532.1486 (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	32.8957	32.9746	33.0523	33.4222	33.4923	33.8226	33.8226	33.8845	33.6946	33.4923	33.3507	33.2040
alpha	3.1930	3.1983	3.2035	3.2281	3.2328	3.2548	3.2548	3.2590	3.2463	3.2328	3.2234	3.2136
util living area	0.9488	0.9215	0.8778	0.7873	0.6551	0.4945	0.3689	0.4095	0.6115	0.8233	0.9212	0.9544 (86)
MIT	19.2361	19.5291	19.9203	20.3972	20.7402	20.9236	20.9777	20.9685	20.8450	20.3991	19.7510	19.1878 (87)
Th 2	19.9734	19.9756	19.9777	19.9879	19.9898	19.9987	19.9987	20.0003	19.9952	19.9898	19.9859	19.9819 (88)
util rest of house	0.9401	0.9088	0.8581	0.7545	0.6051	0.4269	0.2890	0.3264	0.5432	0.7881	0.9063	0.9467 (89)
MIT 2	17.9467	18.3122	18.7952	19.3707	19.7552	19.9448	19.9879	19.9841	19.8753	19.3896	18.6025	17.8920 (90)
Living area fraction	18.6188	18.9465	19.3816	19.9057	20.2687	20.4550	20.5038	20.4972	20.3808	19.9158	19.2012	18.5675 (92)
MIT	18.6188	18.9465	19.3816	19.9057	20.2687	20.4550	20.5038	20.4972	20.3808	19.9158	19.2012	18.5675 (93)
Temperature adjustment												0.0000
adjusted MIT	18.6188	18.9465	19.3816	19.9057	20.2687	20.4550	20.5038	20.4972	20.3808	19.9158	19.2012	18.5675 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9258	0.8935	0.8450	0.7516	0.6195	0.4584	0.3299	0.3684	0.5705	0.7852	0.8924	0.9330 (94)
Useful gains	514.5522	571.5649	594.6399	587.1510	515.3871	378.0375	260.3769	270.7426	387.3754	474.3518	491.4197	496.4957 (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	1001.2950	979.9059	896.5294	757.4962	588.5226	398.2099	265.5068	278.1493	428.7925	639.8388	834.6749	995.3704 (97)
Space heating kWh	362.1366	274.4052	224.6058	122.6485	54.4128	0.0000	0.0000	0.0000	0.0000	123.1223	247.1437	371.1628 (98a)
Space heating requirement - total per year (kWh/year)												1779.6378
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	362.1366	274.4052	224.6058	122.6485	54.4128	0.0000	0.0000	0.0000	0.0000	123.1223	247.1437	371.1628 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1779.6378
Space heating per m ²										(98c) / (4) =		28.8528 (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
	362.1366	274.4052	224.6058	122.6485	54.4128	0.0000	0.0000	0.0000	0.0000	123.1223	247.1437	371.1628 (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)	392.3474	297.2971	243.3433	132.8803	58.9521	0.0000	0.0000	0.0000	0.0000	133.3937	267.7613	402.1265 (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	210.7807	186.4992	198.5426	175.7468	171.1199	155.0320	153.7021	159.3935	160.6670	178.1319	188.1210	208.6530 (64)
Efficiency of water heater	85.2622	84.9244	84.3371	83.2688	81.8002	79.8000	79.8000	79.8000	79.8000	83.2483	84.6727	85.3365 (217)
Fuel for water heating, kWh/month	247.2148	219.6062	235.4156	211.0595	209.1926	194.2758	192.6092	199.7412	201.3371	213.9765	222.1744	244.5060 (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	18.6132	14.9322	13.4448	9.8502	7.6086	6.2163	6.9408	9.0219	11.7186	15.3754	17.3665	19.1305 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-5.1486	-8.0736	-12.8915	-16.1547	-18.9538	-18.2705	-18.0519	-16.2597	-13.4148	-9.9110	-5.9423	-4.3616 (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)

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Electricity generated by PVs (Appendix M) (negative quantity)												
(233b)m	-0.8722	-1.9228	-3.9940	-6.2641	-8.5527	-8.6932	-8.5893	-7.1449	-5.0751	-2.8308	-1.1893	-0.6833 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)												
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year												
Space heating fuel - main system 1												1928.1016 (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												2591.1088 (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)												150.2191 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-203.2459 (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												4552.1837 (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	1928.1016	0.2100	404.9013 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2591.1088	0.2100	544.1328 (264)
Space and water heating			949.0342 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	150.2191	0.1443	21.6813 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-147.4342	0.1324	-19.5255
PV Unit electricity exported	-55.8117	0.1247	-6.9576
Total			-26.4831 (269)
Total CO2, kg/year			956.1616 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			15.5000 (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	1928.1016	1.1300	2178.7549 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2591.1088	1.1300	2927.9529 (278)
Space and water heating			5106.7078 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	150.2191	1.5338	230.4111 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-147.4342	1.4893	-219.5787
PV Unit electricity exported	-55.8117	0.4575	-25.5358
Total			-245.1146 (283)
Total Primary energy kWh/year			5222.1052 (286)
Target Primary Energy Rate (TPER)			84.6600 (287)

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Plot Reference	B 1506	Issued on Date	19/03/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2
SAP Rating	84 B	DER	14.45
Environmental	89 B	% DER < TER	6.77
CO ₂ Emissions (t/year)	0.82	DFEE	38.64
Compliance Check	See BREL	% DFEE < TFEE	-5.58
% DPER < TPER	2.47	DPER	82.57
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	61.6800 (1b)	2.5000 (2b)	154.2000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.6800		154.2000 (4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 154.2000 (5)

2. Ventilation rate

	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) = 0.1297 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2797 (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) = 0.2377 (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	0.3031	0.2972	0.2912	0.2615	0.2556	0.2259	0.2259	0.2199	0.2377	0.2556	0.2675	0.2794 (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	0.5459	0.5442	0.5424	0.5342	0.5327	0.5255	0.5255	0.5242	0.5283	0.5327	0.5358	0.5390 (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							
Windows			19.5600	1.1450	22.3969		(27)
Door			2.4200	1.0000	2.4200		(26)
External Wall 1	39.2300	19.5600	19.6700	0.1500	2.9505	70.0000	1376.9000 (29a)
Corridor wall	24.7300	2.4200	22.3100	0.1900	4.2389	70.0000	1561.7000 (29a)
External Roof 1	61.6800		61.6800	0.1000	6.1680	9.0000	555.1200 (30)
Total net area of external elements A _{um} (A, m ²)			125.6400				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 38.1743		(33)
Main dwelling							
Party Wall 1			16.8800	0.0000	0.0000	70.0000	1181.5999 (32)
Party Floor 1			61.6800			40.0000	2467.2000 (32a)
Internal Wall 1			126.5300			9.0000	1138.7700 (32c)
Heat capacity C _m = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 8281.2899 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							134.2622 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					9.1600	0.0500	0.4580
E4 Jamb					28.8000	0.0400	1.1520

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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	32.4351	32.4767	32.5175	32.7108	32.7472	32.9178	32.9178	32.9496	32.8519	32.7472	32.6736	32.5970
alpha	3.1623	3.1651	3.1678	3.1807	3.1831	3.1945	3.1945	3.1966	3.1901	3.1831	3.1782	3.1731
util living area	0.9720	0.9544	0.9254	0.8580	0.7464	0.5891	0.4516	0.4991	0.7081	0.8885	0.9553	0.9756 (86)
MIT	18.9275	19.2166	19.6244	20.1601	20.5959	20.8646	20.9566	20.9398	20.7468	20.1770	19.4628	18.8713 (87)
Th 2	19.9603	19.9615	19.9627	19.9682	19.9692	19.9740	19.9740	19.9749	19.9721	19.9692	19.9671	19.9650 (88)
util rest of house	0.9669	0.9462	0.9117	0.8315	0.6990	0.5144	0.3556	0.4011	0.6398	0.8617	0.9459	0.9711 (89)
MIT 2	18.0838	18.3683	18.7671	19.2814	19.6757	19.8971	19.9573	19.9499	19.8132	19.3096	18.6183	18.0317 (90)
Living area fraction									fLA = Living area /	(4) =		0.5212 (91)
MIT	18.5236	18.8104	19.2140	19.7394	20.1553	20.4014	20.4782	20.4659	20.2998	19.7617	19.0585	18.4693 (92)
Temperature adjustment												0.0000
adjusted MIT	18.5236	18.8104	19.2140	19.7394	20.1553	20.4014	20.4782	20.4659	20.2998	19.7617	19.0585	18.4693 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9576	0.9348	0.8998	0.8248	0.7082	0.5468	0.4039	0.4495	0.6632	0.8554	0.9354	0.9625 (94)
Useful gains	422.0421	480.0370	509.8579	524.2896	480.4025	369.4942	260.9414	269.5489	366.3214	415.2363	410.4528	404.8382 (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	1008.7649	985.2922	899.4137	762.2717	593.9543	405.4119	271.0150	283.8561	434.1242	643.5752	841.9263	1006.9814 (97)
Space heating kWh	436.5218	339.5315	289.8295	171.3471	84.4826	0.0000	0.0000	0.0000	0.0000	169.8842	310.6609	447.9945 (98a)
Space heating requirement - total per year (kWh/year)												2250.2522
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	436.5218	339.5315	289.8295	171.3471	84.4826	0.0000	0.0000	0.0000	0.0000	169.8842	310.6609	447.9945 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2250.2522
Space heating per m2										(98c) / (4) =		36.4827 (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	656.8905	517.1265	530.5906	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8126	0.8711	0.8426	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	533.8051	450.4730	447.0951	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	757.1806	724.1967	671.6411	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	160.8304	203.6505	167.0623	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction												
Intermittency factor (Table 10b)									fC = cooled area /	(4) =		1.0000 (105)
	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	40.2076	50.9126	41.7656	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												132.8858 (107)
Energy for space heating												36.4827 (99)
Energy for space cooling												2.1544 (108)
Total												38.6371 (109)
Fabric Energy Efficiency (DFEE)												38.6 (109)

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

CALCULATION OF TARGET FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	61.6800 (1b)	x 2.5000 (2b)	= 154.2000 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	61.6800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	154.2000 (5)

2. Ventilation rate

	m3 per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	2 * 10 = 20.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Air changes per hour	

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Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) = 20.0000 / (5) = 0.1297 (8)
 Pressure test Yes
 Pressure Test Method Blower Door
 Measured/design AP50 5.0000 (17)
 Infiltration rate 0.3797 (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) = 0.3227 (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	0.4115	0.4034	0.3954	0.3550	0.3470	0.3066	0.3066	0.2985	0.3227	0.3470	0.3631	0.3792	(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	0.5847	0.5814	0.5782	0.5630	0.5602	0.5470	0.5470	0.5446	0.5521	0.5602	0.5659	0.5719	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Main dwelling								
TER Opaque door			2.4200	1.0000	2.4200			(26)
TER Opening Type			13.0000	1.1450	14.8855			(27)
External Wall 1	39.2300	13.0000	26.2300	0.1800	4.7214			(29a)
Corridor wall	24.7300	2.4200	22.3100	0.1800	4.0158			(29a)
External Roof 1	61.6800		61.6800	0.1100	6.7848			(30)
Total net area of external elements Aum (A, m2)			125.6400					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 32.8275			(33)
Main dwelling								
Party Wall 1			16.8800	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							134.2622	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	9.1600	0.0500	0.4580	
E4 Jamb	28.8000	0.0500	1.4400	
E7 Party floor between dwellings (in blocks of flats)	12.2900	0.0700	0.8603	
E7 Party floor between dwellings (in blocks of flats)	9.8900	0.0700	0.6923	
E9 Balcony between dwellings, wall insulation continuous	3.4000	0.0200	0.0680	
E16 Corner (normal)	5.0000	0.0900	0.4500	
E16 Corner (normal)	2.5000	0.0900	0.2250	
E18 Party wall between dwellings	2.5000	0.0600	0.1500	
E25 Staggered party wall between dwellings	2.5000	0.0600	0.1500	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	6.7500	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	6.7500	0.1200	0.8100	
E14 Flat roof	25.5800	0.0800	2.0464	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			7.3500	(36)
Point Thermal bridges			0.0000	(36a) =
Total fabric heat loss			(33) + (36) + (36a) = 40.1775	(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	29.7514	29.5841	29.4201	28.6498	28.5057	27.8349	27.8349	27.7106	28.0933	28.5057	28.7973	29.1020	(38)
Heat transfer coeff	69.9289	69.7616	69.5976	68.8273	68.6832	68.0124	68.0124	67.8881	68.2708	68.6832	68.9748	69.2795	(39)
Average = Sum(39)m / 12 =												68.8266	
HLP	1.1337	1.1310	1.1284	1.1159	1.1135	1.1027	1.1027	1.1007	1.1069	1.1135	1.1183	1.1232	(40)
HLP (average)												1.1159	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.0287	(42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for baths	25.1659	24.7922	24.2659	23.2954	22.5688	21.7631	21.3278	21.8505	22.4195	23.2817	24.2721	25.0809		(42b)
Hot water usage for other uses	35.4061	34.1186	32.8311	31.5436	30.2561	28.9686	28.9686	30.2561	31.5436	32.8311	34.1186	35.4061		(42c)
Average daily hot water use (litres/day)												55.5201		(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Daily hot water use	60.5720	58.9108	57.0970	54.8390	52.8249	50.7317	50.2964	52.1066	53.9631	56.1128	58.3907	60.4869		(44)
Energy content (annual)	95.9313	83.8881	87.7559	75.0719	71.1124	62.3805	60.8292	64.5188	66.5419	76.1445	83.1882	94.7079		(45)
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		922.0707		
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		(46)
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														
WWHRS	81.5416	71.3049	74.5925	63.8111	60.4456	53.0234	51.7048	54.8410	56.5606	64.7228	70.7100	80.5017		(62)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(63a)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(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	81.5416	71.3049	74.5925	63.8111	60.4456	53.0234	51.7048	54.8410	56.5606	64.7228	70.7100	80.5017		(64)
12Total per year (kWh/year)									Total per year (kWh/year) = Sum(64)m =			783.7601		(64)
Electric shower(s)	46.6361	41.5531	45.3744	43.3003	44.1128	42.0793	43.4820	44.1128	43.3003	45.3744	44.5212	46.6361		(64a)
				Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =								530.4828		(64a)
Heat gains from water heating, kWh/month														

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32.0444 28.2145 29.9917 26.7778 26.1396 23.7757 23.7967 24.7384 24.9652 27.5243 28.8078 31.7845 (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	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	101.4357	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	89.5812	99.1791	89.5812	92.5672	89.5812	92.5672	89.5812	89.5812	92.5672	89.5812	92.5672	89.5812	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	177.1632	179.0016	174.3689	164.5064	152.0568	140.3559	132.5390	130.7006	135.3333	145.1958	157.6454	169.3463	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	33.1436	(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)	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	-81.1486	(71)
Water heating gains (Table 5)	43.0705	41.9859	40.3115	37.1915	35.1339	33.0218	31.9848	33.2506	34.6739	36.9950	40.0108	42.7210	(72)
Total internal gains	363.2455	373.5973	357.6922	347.6957	330.2025	319.3756	307.5356	306.9630	316.0051	325.2027	343.6541	355.0792	(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				6.5100	36.7938	0.6300	0.7000	0.7700	73.2028 (79)			
Northwest				6.4900	11.2829	0.6300	0.7000	0.7700	22.3789 (81)			
Solar gains	95.5817	170.2444	252.6802	346.1776	417.9549	428.2196	407.3199	351.7394	284.7386	193.4799	115.8386	80.9221 (83)
Total gains	458.8272	543.8417	610.3724	693.8733	748.1574	747.5952	714.8555	658.7025	600.7437	518.6826	459.4927	436.0013 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)

Utilisation factor for gains for living area, nil _m (see Table 9a)													21.0000 (85)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	32.8957	32.9746	33.0523	33.4222	33.4923	33.8226	33.8226	33.8845	33.6946	33.4923	33.3507	33.2040	
alpha	3.1930	3.1983	3.2035	3.2281	3.2328	3.2548	3.2548	3.2590	3.2463	3.2328	3.2234	3.2136	
util living area	0.9686	0.9468	0.9102	0.8279	0.7003	0.5358	0.4040	0.4512	0.6648	0.8688	0.9491	0.9729	(86)
MIT	19.0078	19.3235	19.7489	20.2848	20.6819	20.9034	20.9709	20.9581	20.8010	20.2696	19.5541	18.9566	(87)
Th 2	19.9734	19.9756	19.9777	19.9879	19.9898	19.9987	19.9987	20.0003	19.9952	19.9898	19.9859	19.9819	(88)
util rest of house	0.9630	0.9375	0.8945	0.7985	0.6513	0.4652	0.3178	0.3617	0.5963	0.8393	0.9386	0.9680	(89)
MIT 2	18.1717	18.4821	18.8963	19.4090	19.7623	19.9447	19.9875	19.9832	19.8724	19.4092	18.7203	18.1275	(90)
Living area fraction									f _{LA} = Living area / (4) =			0.5212	(91)
MIT	18.6075	18.9207	19.3407	19.8655	20.2416	20.4444	20.5001	20.4914	20.3564	19.8577	19.1549	18.5597	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.6075	18.9207	19.3407	19.8655	20.2416	20.4444	20.5001	20.4914	20.3564	19.8577	19.1549	18.5597	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9533	0.9258	0.8830	0.7945	0.6642	0.4975	0.3617	0.4067	0.6222	0.8349	0.9280	0.9591	(94)
Useful gains	437.4011	503.4618	538.9462	551.2970	496.8953	371.9353	258.5353	267.8749	373.8075	433.0411	426.4022	418.1629	(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	1000.5088	978.1038	893.6820	754.7247	586.6648	397.4940	265.2546	277.7548	427.1277	635.8463	831.4850	994.8300	(97)
Space heating kWh	418.9522	318.9595	263.9234	146.4680	66.7885	0.0000	0.0000	0.0000	0.0000	150.8871	291.6596	429.0403	(98a)
Space heating requirement - total per year (kWh/year)												2086.6785	
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	418.9522	318.9595	263.9234	146.4680	66.7885	0.0000	0.0000	0.0000	0.0000	150.8871	291.6596	429.0403	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2086.6785	
Space heating per m ²										(98c) / (4) =		33.8307	(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	639.3163	503.2915	515.9499	0.0000	0.0000	0.0000	0.0000	(100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8572	0.9058	0.8810	0.0000	0.0000	0.0000	0.0000	(101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	548.0274	455.8660	454.5363	0.0000	0.0000	0.0000	0.0000	(102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	840.6379	804.1369	740.2340	0.0000	0.0000	0.0000	0.0000	(103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	210.6796	259.1136	212.5591	0.0000	0.0000	0.0000	0.0000	(104)
Cooled fraction									f _C = 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	52.6699	64.7784	53.1398	0.0000	0.0000	0.0000	0.0000	(107)
Space cooling requirement												170.5881	(107)
Energy for space heating												33.8307	(99)
Energy for space cooling												2.7657	(108)
Total												36.5964	(109)
Fabric Energy Efficiency (TFEE)												36.6	(109)

