

Land West of Selsfield Road

Appendix 01 SAP
Worksheets

Version 01

N^o PLANET

Project Details

PROJECT NAME

Land West of Selsfield Road,
Ardingly

PROJECT REFERENCE

26.2009

CLIENT

Antler Homes Ltd

REPORT

Appendix 01 SAP Worksheets

DATE ISSUED

07.05.2026

VERSION

01

Document History

AUTHOR	AUDIT	VERSION	ISSUED	REASON FOR ISSUE	DISTRIBUTION
RR	CM	01	07.05.2026	DRAFT ISSUE FOR COMMENT	CLIENT: ANTLER HOMES LTD PLANNING CONSULTANT: SAVILLS

Summary for Input Data



Plot Reference	AT01	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	85 B	DER	11.85	TER	10.86
Environmental	90 B	% DER < TER			-9.12
CO ₂ Emissions (t/year)	0.99	DFEE	37.27	TFEE	37.79
Compliance Check	See BREL	% DFEE < TFEE			1.38
% DPER < TPER	-20.42	DPER	68.11	TPER	56.56

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Semi-Detached
2.0 Number of Storeys	2
3.0 Date Built	2026
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Enter TMP value
Thermal Mass	250.00
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	23.11 m	46.51 m²	2.40 m
	1st Storey:	23.11 m	46.51 m²	2.69 m

8.0 Living Area	18.82	m²
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Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		55.46	35.86	0.00	None	19.60	Enter Gross Area
WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		62.05	50.97	0.00	None	11.08	Enter Gross Area

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Solid Wall	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00		26.39	0.00	None

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	46.51	46.51	None	0.00	Enter Gross Area	0.00

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	46.51

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
DG Win	Manufacturer	Window	Double Low-E Soft	0.05		0.63		0.70	1.20
Solid door	Manufacturer	Solid Door				0.63			1.00

Summary for Input Data

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	North West	2.10	
D002	DG Win	WT01 Brick	South East	5.22	
D003	DG Win	WT01 Brick	South East	5.22	
W001	DG Win	WT01 Brick	North West	2.17	
W002	DG Win	WT01 Brick	North West	2.17	
W003	DG Win	WT02 Tile hung	North West	1.48	
W004	DG Win	WT02 Tile hung	North West	0.82	
W005	DG Win	WT02 Tile hung	North West	1.48	
W006	DG Win	WT01 Brick	South West	2.72	
W007	DG Win	WT02 Tile hung	South West	2.17	
W008	DG Win	WT02 Tile hung	South East	2.17	
W009	DG Win	WT02 Tile hung	South East	1.48	
W010	DG Win	WT02 Tile hung	South East	1.48	

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	20.04	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	14.07	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	38.42	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	23.11	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	23.11	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	14.92	0.06	0.06 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.24	0.24 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	8.19	0.06	0.06 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	10.17	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	0.00	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	10.17	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	5.19	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	5.19	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	5.19	0.12	0.12 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
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

Summary for Input Data

Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Test Method

22.0 Lighting
No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1

Percentage of Heat %

Fuel Type

SAP Code

In Winter

In Summer

Model Name

Manufacturer

Controls SAP Code

Controls description

Delayed Start Stat

Burner Control

Flue Type

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Boiler Interlock

25.0 Main Heating 2

26.0 Heat Networks

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

28.1 Showers

Summary for Input Data



Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Cylinder Volume	200.00 L
Loss	1.72 kWh/day
Pipes insulation	All accessible pipework insulated

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

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

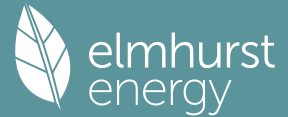
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT01				Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref				
Plot Address					SAP Version	10.2
SAP Rating	85 B	DER	11.85	TER	10.86	
Environmental	90 B	% DER < TER				-9.12
CO ₂ Emissions (t/year)	0.99	DFEE	37.27	TFEE	37.79	
Compliance Check	See BREL	% DFEE < TFEE				1.38
% DPER < TPER	-20.42	DPER	68.11	TPER	56.56	
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC					

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	46.5100 (1b)	x 2.4000 (2b)	= 111.6240 (1b) - (3b)
First floor	46.5100 (1c)	x 2.6900 (2c)	= 125.1119 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 236.7359 (5)

2. Ventilation rate

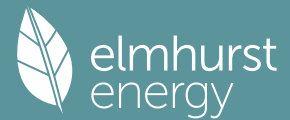
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			28.5800	1.1450	32.7252		(27)
Solid door			2.1000	1.0000	2.1000		(26)
FT01			46.5100	0.1300	6.0463		(28a)
WT01 Brick	55.4600	19.6000	35.8600	0.1800	6.4548		(29a)
WT02 Tile hung	62.0500	11.0800	50.9700	0.1800	9.1746		(29a)
RT01	46.5100		46.5100	0.1100	5.1161		(30)
Total net area of external elements Aum(A, m ²)			210.5300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	61.6170		(33)
Main dwelling							
Party Wall 1			26.3900	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

Full SAP Calculation Printout



E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	20.0400	0.0500	1.0020
E3 Sill	14.0700	0.0500	0.7035
E4 Jamb	38.4200	0.0500	1.9210
E5 Ground floor (normal)	23.1100	0.1600	3.6976
E6 Intermediate floor within a dwelling	23.1100	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	14.9200	0.0600	0.8952
E11 Eaves (insulation at rafter level)	0.0000	0.2400	0.0000
E12 Gable (insulation at ceiling level)	8.1900	0.0600	0.4914
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000
E16 Corner (normal)	10.1700	0.0900	0.9153
E17 Corner (inverted - internal area greater than external area)	0.0000	-0.0900	-0.0000
E18 Party wall between dwellings	10.1700	0.0600	0.6102
P1 Party wall - Ground floor	5.1900	0.0800	0.4152
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	5.1900	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	5.1900	0.1200	0.6228
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			11.2742 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	72.8912 (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	20.8246	20.5756	20.3266	19.0815	18.8325	17.5874	17.5874	17.3384	18.0854	18.8325	19.3305	19.8286	(38)
Average = Sum(39)m / 12 =	93.7158	93.4668	93.2178	91.9727	91.7237	90.4786	90.4786	90.2296	90.9766	91.7237	92.2217	92.7197	(39)
												91.9104	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0075	1.0048	1.0021	0.9887	0.9861	0.9727	0.9727	0.9700	0.9780	0.9861	0.9914	0.9968	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

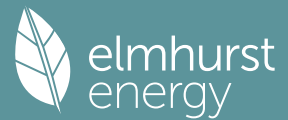
4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.6648 (42)
Hot water usage for mixer showers												
68.9004	67.8650	66.3561	63.4692	61.3388	58.9629	57.6125	59.1099	60.7514	63.3023	66.2512	68.6364	(42a)
Hot water usage for baths												
29.7527	29.3108	28.6885	27.5412	26.6821	25.7296	25.2150	25.8329	26.5057	27.5250	28.6959	29.6521	(42b)
Hot water usage for other uses												
41.9206	40.3963	38.8719	37.3475	35.8231	34.2987	34.2987	35.8231	37.3475	38.8719	40.3963	41.9206	(42c)
Average daily hot water use (litres/day)												129.2189 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	140.5737	137.5720	133.9165	128.3580	123.8440	118.9912	117.1262	120.7659	124.6045	129.6992	135.3434	140.2091 (44)
Energy conte	222.6344	195.9007	205.8247	175.7156	166.7179	146.3136	141.6540	149.5334	153.6498	176.0005	192.8214	219.5336 (45)
Energy content (annual)										Total = Sum(45)m =		2146.2997
Distribution loss (46)m = 0.15 x (45)m												
33.3952	29.3851	30.8737	26.3573	25.0077	21.9470	21.2481	22.4300	23.0475	26.4001	28.9232	32.9300	(46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss												
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(56)
If cylinder contains dedicated solar storage												
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month												
288.7251	255.5956	271.9155	239.6744	232.8086	210.2724	207.7448	215.6242	217.6086	242.0913	256.7802	285.6244	(62)
WWHRS	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	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h												
288.7251	255.5956	271.9155	239.6744	232.8086	210.2724	207.7448	215.6242	217.6086	242.0913	256.7802	285.6244	(64)
Total per year (kWh/year)												2924.4651 (64)
Electric shower(s)												2924 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
126.8985	112.8929	121.3093	109.5925	108.3063	99.8163	99.9726	102.5925	102.2556	111.3928	115.2802	125.8675	(65)

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
123.3350	136.5494	123.3350	127.4461	123.3350	127.4461	123.3350	123.3350	123.3350	127.4461	123.3350	127.4461	123.3350 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
244.5253	247.0628	240.6686	227.0561	209.8728	193.7229	182.9338	180.3964	186.7906	200.4031	217.5864	233.7362	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	(71)
Water heating gains (Table 5)												
170.5626	167.9954	163.0502	152.2118	145.5730	138.6337	134.3717	137.8931	142.0217	149.7215	160.1113	169.1768	(72)
Total internal gains												
604.3955	617.5802	593.0263	572.6866	544.7534	522.7754	503.6131	504.5971	519.2310	539.4321	571.1165	592.2206	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a	g Specific data	FF Specific data	Access factor	Gains W
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Full SAP Calculation Printout



					W/m2		or Table 6b		or Table 6c		Table 6d	
Southeast			15.5700		36.7938		0.6300		0.7000		0.7700	175.0796 (77)
Southwest			4.8900		36.7938		0.6300		0.7000		0.7700	54.9865 (79)
Northwest			8.1200		11.2829		0.6300		0.7000		0.7700	27.9995 (81)

Solar gains	258.0655	448.8813	638.8823	833.0126	970.8374	980.4411	938.3316	832.9665	705.7115	502.7701	310.7967	219.7544 (83)
Total gains	862.4610	1066.4615	1231.9086	1405.6992	1515.5908	1503.2165	1441.9447	1337.5636	1224.9425	1042.2023	881.9131	811.9750 (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	68.9288	69.1125	69.2971	70.2352	70.4259	71.3950	71.3950	71.5921	71.0042	70.4259	70.0456	69.6693	
alpha	5.5953	5.6075	5.6198	5.6823	5.6951	5.7597	5.7597	5.7728	5.7336	5.6951	5.6697	5.6446	
util living area	0.9837	0.9529	0.8854	0.7363	0.5533	0.3842	0.2760	0.3101	0.5070	0.8105	0.9592	0.9877 (86)	
MIT	20.3086	20.5109	20.7130	20.8761	20.9327	20.9448	20.9460	20.9459	20.9399	20.8483	20.5573	20.2732 (87)	
Th 2	20.0771	20.0793	20.0816	20.0927	20.0950	20.1062	20.1062	20.1084	20.1017	20.0950	20.0905	20.0860 (88)	
util rest of house	0.9790	0.9409	0.8603	0.6942	0.5027	0.3310	0.2200	0.2501	0.4433	0.7650	0.9466	0.9841 (89)	
MIT 2	19.2838	19.5353	19.7757	19.9614	20.0158	20.0364	20.0370	20.0393	20.0289	19.9409	19.6055	19.2467 (90)	
Living area fraction									fLA = Living area / (4) =				0.2023 (91)
MIT	19.4912	19.7327	19.9653	20.1465	20.2013	20.2202	20.2209	20.2228	20.2132	20.1245	19.7981	19.4544 (92)	
Temperature adjustment												-0.1500	
adjusted MIT	19.3412	19.5827	19.8153	19.9965	20.0513	20.0702	20.0709	20.0728	20.0632	19.9745	19.6481	19.3044 (93)	

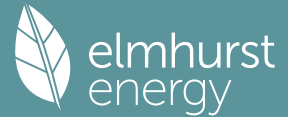
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9741	0.9332	0.8521	0.6895	0.5002	0.3289	0.2178	0.2477	0.4406	0.7584	0.9391	0.9801 (94)
Useful gains	840.1605	995.1967	1049.7303	969.1891	758.1546	494.3807	314.0038	331.3127	539.6646	790.3739	828.1704	795.8122 (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	1409.5946	1372.3407	1241.2235	1020.5727	766.0122	494.9334	314.0416	331.3919	542.5100	859.8624	1157.2053	1400.4733 (97)
Space heating kWh	423.6590	253.4408	142.4709	36.9962	5.8461	0.0000	0.0000	0.0000	0.0000	51.6994	236.9051	449.8679 (98a)
Space heating requirement - total per year (kWh/year)												1600.8853
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	423.6590	253.4408	142.4709	36.9962	5.8461	0.0000	0.0000	0.0000	0.0000	51.6994	236.9051	449.8679 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1600.8853
Space heating per m2										(98c) / (4) =		17.2101 (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 %)												92.5000 (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	423.6590	253.4408	142.4709	36.9962	5.8461	0.0000	0.0000	0.0000	0.0000	51.6994	236.9051	449.8679 (98)
Space heating efficiency (main heating system 1)	92.5000	92.5000	92.5000	92.5000	92.5000	0.0000	0.0000	0.0000	0.0000	92.5000	92.5000	92.5000 (210)
Space heating fuel (main heating system)	458.0097	273.9901	154.0226	39.9958	6.3201	0.0000	0.0000	0.0000	0.0000	55.8913	256.1136	486.3437 (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	288.7251	255.5956	271.9155	239.6744	232.8086	210.2724	207.7448	215.6242	217.6086	242.0913	256.7802	285.6244 (64)
Efficiency of water heater (217)m	92.5000	92.5000	92.5000	92.5000	92.5000	92.5000	92.5000	92.5000	92.5000	92.5000	92.5000	92.5000 (216)
Fuel for water heating, kWh/month	312.1353	276.3196	293.9627	259.1075	251.6850	227.3215	224.5889	233.1072	235.2526	261.7203	277.6003	308.7831 (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	27.8647	25.1682	27.8647	26.9659	27.8647	26.9659	27.8647	27.8647	26.9659	27.8647	26.9659	27.8647 (223)
Lighting	25.1028	20.1384	18.1324	13.2846	10.2614	8.3836	9.3608	12.1675	15.8044	20.7362	23.4215	25.8005 (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												1730.6868 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)

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Efficiency of water heater	92.5000
Water heating fuel used	3161.5839 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)	
mechanical ventilation fans (SFP = 0.9940)	287.0849 (230a)
central heating pump	41.0000 (230c)
Total electricity for the above, kWh/year	328.0849 (231)
Electricity for lighting (calculated in Appendix L)	202.5938 (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	5422.9493 (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	1730.6868	0.2100	363.4442	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3161.5839	0.2100	663.9326	(264)
Space and water heating			1027.3768	(265)
Pumps, fans and electric keep-hot	328.0849	0.1387	45.5094	(267)
Energy for lighting	202.5938	0.1443	29.2405	(268)
Total CO2, kg/year			1102.1268	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			11.8500	(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	1730.6868	1.1300	1955.6760	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3161.5839	1.1300	3572.5898	(278)
Space and water heating			5528.2658	(279)
Pumps, fans and electric keep-hot	328.0849	1.5128	496.3268	(281)
Energy for lighting	202.5938	1.5338	310.7451	(282)
Total Primary energy kWh/year			6335.3377	(286)
Dwelling Primary energy Rate (DPER)			68.1100	(287)

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

1. Overall dwelling characteristics

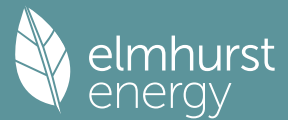
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	46.5100 (1b)	x 2.4000 (2b)	= 111.6240	(1b) - (3b)
First floor	46.5100 (1c)	x 2.6900 (2c)	= 125.1119	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0200			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 236.7359	(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) =	0.1267 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3767	(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) =	0.3202 (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	0.4083	0.4003	0.3923	0.3522	0.3442	0.3042	0.3042	0.2962	0.3202	0.3442	0.3602	0.3763 (22b)

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Effective ac 0.5833 0.5801 0.5769 0.5620 0.5592 0.5463 0.5463 0.5439 0.5513 0.5592 0.5649 0.5708 (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			2.1000	1.0000	2.1000		(26)
TER Opening Type			21.1800	1.1450	24.2519		(27)
FT01			46.5100	0.1300	6.0463		(28a)
WT01 Brick	55.4600	15.0500	40.4100	0.1800	7.2738		(29a)
WT02 Tile hung	62.0500	8.2300	53.8200	0.1800	9.6876		(29a)
RT01	46.5100		46.5100	0.1100	5.1161		(30)
Total net area of external elements Aum(A, m2)			210.5300				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		54.4757		(33)
Main dwelling							
Party Wall 1			26.3900	0.0000	0.0000		(32)

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

250.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element	0.0000	0.0500	0.0000
E1 Steel lintel with perforated steel base plate	20.0400	0.0500	1.0020
E2 Other lintels (including other steel lintels)	14.0700	0.0500	0.7035
E3 Sill	38.4200	0.0500	1.9210
E4 Jamb	23.1100	0.1600	3.6976
E5 Ground floor (normal)	23.1100	0.0000	0.0000
E6 Intermediate floor within a dwelling	14.9200	0.0600	0.8952
E10 Eaves (insulation at ceiling level)	0.0000	0.0400	0.0000
E11 Eaves (insulation at rafter level)	8.1900	0.0600	0.4914
E12 Gable (insulation at ceiling level)	0.0000	0.0800	0.0000
E13 Gable (insulation at rafter level)	10.1700	0.0900	0.9153
E16 Corner (normal)	0.0000	-0.0900	-0.0000
E17 Corner (inverted - internal area greater than external area)	10.1700	0.0600	0.6102
E18 Party wall between dwellings	5.1900	0.0800	0.4152
P1 Party wall - Ground floor	0.0000	0.0000	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	5.1900	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	5.1900	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	5.1900	0.1200	0.6228

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

11.2742 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 65.7499 (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	45.5725	45.3197	45.0718	43.9078	43.6900	42.6762	42.6762	42.4884	43.0667	43.6900	44.1306	44.5912
Heat transfer coeff	111.3224	111.0696	110.8217	109.6577	109.4399	108.4261	108.4261	108.2383	108.8166	109.4399	109.8805	110.3411
Average = Sum(39)m / 12 =												109.6567

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.1968	1.1940	1.1914	1.1789	1.1765	1.1656	1.1656	1.1636	1.1698	1.1765	1.1813	1.1862
HLP (average)												1.1789
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

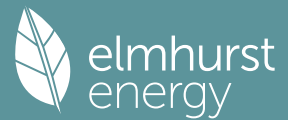
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6648 (42)
Hot water usage for mixer showers	68.9004	67.8650	66.3561	63.4692	61.3388	58.9629	57.6125	59.1099	60.7514	63.3023	66.2512	68.6364	(42a)
Hot water usage for baths	29.7527	29.3108	28.6885	27.5412	26.6821	25.7296	25.2150	25.8329	26.5057	27.5250	28.6959	29.6521	(42b)
Hot water usage for other uses	41.9206	40.3963	38.8719	37.3475	35.8231	34.2987	34.2987	35.8231	37.3475	38.8719	40.3963	41.9206	(42c)
Average daily hot water use (litres/day)													129.2189 (43)
Daily hot water use	140.5737	137.5720	133.9165	128.3580	123.8440	118.9912	117.1262	120.7659	124.6045	129.6992	135.3434	140.2091	(44)
Energy conte	222.6344	195.9007	205.8247	175.7156	166.7179	146.3136	141.6540	149.5334	153.6498	176.0005	192.8214	219.5336	(45)
Energy content (annual)													Total = Sum(45)m = 2146.2997
Distribution loss (46)m = 0.15 x (45)m	33.3952	29.3851	30.8737	26.3573	25.0077	21.9470	21.2481	22.4300	23.0475	26.4001	28.9232	32.9300	(46)
Water storage loss (or HIU loss):													200.0000 (47)
Store volume													1.6525 (48)
a) If manufacturer declared loss factor is known (kWh/day):													0.5400 (49)
Temperature factor from Table 2b													0.8924 (55)
Enter (49) or (54) in (55)													
Total storage loss	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)
If cylinder contains dedicated solar storage	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(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	273.5605	241.8984	256.7508	224.9989	217.6439	195.5968	192.5801	200.4595	202.9331	226.9266	242.1047	270.4597	(62)
WWHRS	-31.4984	-27.8574	-29.1707	-24.1545	-22.5111	-19.2629	-18.0559	-19.2007	-19.9302	-23.4955	-26.6175	-30.9151	(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	242.0621	214.0410	227.5801	200.8444	195.1328	176.3339	174.5242	181.2588	183.0030	203.4311	215.4872	239.5446	(64)
12Total per year (kWh/year)													Total per year (kWh/year) = Sum(64)m = 2453.2433 (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	114.7668	101.9352	109.1776	97.8521	96.1745	88.0759	87.8408	90.4607	90.5152	99.2610	103.5398	113.7358	(65)

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

Metabolic gains (Table 5), Watts

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(66)
(66)m	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	123.3096	136.5214	123.3096	127.4199	123.3096	127.4199	123.3096	123.3096	127.4199	123.3096	127.4199	123.3096	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	244.5253	247.0628	240.6686	227.0561	209.8728	193.7229	182.9338	180.3964	186.7906	200.4031	217.5864	233.7362	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	(71)
Water heating gains (Table 5)	154.2564	151.6893	146.7441	135.9057	129.2669	122.3276	118.0656	121.5870	125.7156	133.4154	143.8052	152.8707	(72)
Total internal gains	588.0640	601.2460	576.6949	556.3543	528.4219	506.4431	487.2817	488.2657	502.8987	523.1007	554.7842	575.8892	(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
Southeast				11.5300	36.7938		0.6300		0.7000		0.7700		129.6511 (77)
Southwest				3.6200	36.7938		0.6300		0.7000		0.7700		40.7057 (79)
Northwest				6.0300	11.2829		0.6300		0.7000		0.7700		20.7927 (81)
Solar gains	191.1495	332.5049	473.2926	617.1813	719.3607	726.5040	695.2898	617.1720	522.8256	372.4350	230.2108	162.7703	(83)
Total gains	779.2136	933.7509	1049.9875	1173.5357	1247.7826	1232.9471	1182.5715	1105.4377	1025.7243	895.5357	784.9950	738.6595	(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	58.0272	58.1592	58.2893	58.9081	59.0253	59.5772	59.5772	59.6805	59.3634	59.0253	58.7886	58.5432	
alpha	4.8685	4.8773	4.8860	4.9272	4.9350	4.9718	4.9718	4.9787	4.9576	4.9350	4.9192	4.9029	
util living area	0.9915	0.9795	0.9528	0.8780	0.7373	0.5482	0.4008	0.4457	0.6825	0.9140	0.9812	0.9934	(86)
MIT	19.7585	20.0012	20.3063	20.6601	20.8878	20.9793	20.9964	20.9940	20.9417	20.6334	20.1325	19.7178	(87)
Th 2	19.9226	19.9248	19.9269	19.9369	19.9388	19.9476	19.9476	19.9492	19.9442	19.9388	19.9350	19.9310	(88)
util rest of house	0.9888	0.9732	0.9385	0.8438	0.6754	0.4644	0.3063	0.3463	0.5966	0.8814	0.9744	0.9912	(89)
MIT 2	18.5023	18.8097	19.1893	19.6133	19.8522	19.9368	19.9466	19.9473	19.9089	19.5963	18.9860	18.4567	(90)
Living area fraction									fLA = Living area / (4) =			0.2023	(91)
MIT	18.7565	19.0508	19.4153	19.8251	20.0617	20.1478	20.1590	20.1591	20.1178	19.8061	19.2179	18.7118	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7565	19.0508	19.4153	19.8251	20.0617	20.1478	20.1590	20.1591	20.1178	19.8061	19.2179	18.7118	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9847	0.9664	0.9301	0.8398	0.6831	0.4807	0.3255	0.3665	0.6116	0.8765	0.9681	0.9877	(94)
Ext temp.	767.2782	902.3796	976.5653	985.4784	852.3198	592.7119	384.8905	405.0978	627.3501	784.9148	759.9505	729.6046	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Space heating kWh	1609.3285	1571.7220	1431.2951	1198.0200	915.1029	601.5217	385.8844	406.8766	654.8415	1007.5176	1331.5246	1601.2529	(97)
Space heating requirement - total per year (kWh/year)	626.4855	449.7981	338.3190	153.0299	46.7106	0.0000	0.0000	0.0000	0.0000	165.6165	411.5333	648.5063	(98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)	626.4855	449.7981	338.3190	153.0299	46.7106	0.0000	0.0000	0.0000	0.0000	165.6165	411.5333	648.5063	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2839.9993	(99)
Space heating per m ²										(98c) / (4) =		30.5311	(99)

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

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													92.3000 (206)
Efficiency of main space heating system 2 (in %)													0.0000 (207)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating efficiency (main heating system 1)	626.4855	449.7981	338.3190	153.0299	46.7106	0.0000	0.0000	0.0000	0.0000	165.6165	411.5333	648.5063	(98)
Space heating fuel (main heating system)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000	(210)
Space heating efficiency (main heating system 2)	678.7491	487.3218	366.5428	165.7962	50.6074	0.0000	0.0000	0.0000	0.0000	179.4329	445.8649	702.6071	(211)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(212)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement	242.0621	214.0410	227.5801	200.8444	195.1328	176.3339	174.5242	181.2588	183.0030	203.4311	215.4872	239.5446	(64)
Efficiency of water heater (217)m	86.0939	85.6842	84.9471	83.4578	81.3933	79.8000	79.8000	79.8000	79.8000	83.6025	85.4866	86.1783	(216)
Fuel for water heating, kWh/month	281.1606	249.8023	267.9079	240.6538	239.7406	220.9698	218.7019	227.1414	229.3270	243.3314	252.0714	277.9640	(219)

Full SAP Calculation Printout



Space cooling fuel requirement														
(221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	25.6213	20.5544	18.5069	13.5590	10.4733	8.5568	9.5541	12.4188	16.1308	21.1645	23.9053	26.3334	26.3334	(232)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233a)m	-42.8187	-60.0166	-85.7742	-95.8646	-102.8731	-95.8155	-94.5895	-89.5088	-80.5133	-68.3077	-46.9326	-37.0570	-37.0570	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)														
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)														
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)														
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)														
(233b)m	-25.2811	-53.0513	-105.2140	-157.7093	-208.2483	-209.1660	-206.7436	-175.2159	-128.6228	-75.8118	-33.7323	-20.0052	-20.0052	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)														
(234b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)														
(235b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)														
(235d)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
Annual totals kWh/year														
Space heating fuel - main system 1													3076.9223	(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													2948.7722	(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)													206.7786	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV generation													-2298.8733	(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													4019.5998	(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	3076.9223	0.2100	646.1537	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2948.7722	0.2100	619.2422	(264)
Space and water heating			1265.3958	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	206.7786	0.1443	29.8445	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-900.0716	0.1347	-121.2553	
PV Unit electricity exported	-1398.8016	0.1260	-176.1803	
Total			-297.4356	(269)
Total CO2, kg/year			1009.7341	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.8600	(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	3076.9223	1.1300	3476.9222	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2948.7722	1.1300	3332.1126	(278)
Space and water heating			6809.0348	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	206.7786	1.5338	317.1639	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-900.0716	1.4979	-1348.2174	
PV Unit electricity exported	-1398.8016	0.4623	-646.7058	
Total			-1994.9232	(283)
Total Primary energy kWh/year			5261.3763	(286)
Target Primary Energy Rate (TPER)			56.5600	(287)

Summary for Input Data

Plot Reference	AT02	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	85 B	DER	11.72	TER	10.15
Environmental	88 B	% DER < TER			-15.47
CO ₂ Emissions (t/year)	1.51	DFEE	43.02	TFEE	44.74
Compliance Check	See BREL	% DFEE < TFEE			3.86
% DPER < TPER	-25.95	DPER	67.12	TPER	53.29

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	No	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	40.97 m	78.05 m²	2.61 m
	1st Storey:	35.37 m	68.90 m²	2.69 m

8.0 Living Area	15.80	m²
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Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		106.93	83.74	0.00	None	23.19	Enter Gross Area
WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		95.15	85.49	0.00	None	9.66	Enter Gross Area

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	68.90	68.90	None	0.00	Enter Gross Area	0.00
RT03 - Flat Roof	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	9.15	8.07	None	0.00	Enter Gross Area	1.08

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	78.05

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Solid door	Manufacturer	Solid Door				0.63			1.00
Roof Light - Flat	Manufacturer	Roof Light	Double Low-E Soft 0.05			0.63		0.70	1.20

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D001	Solid door	WT01 Brick	North East	2.10	

Summary for Input Data

D002	DG Win	WT01 Brick	South West	5.22
D003	DG Win	WT01 Brick	South West	5.22
W001	DG Win	WT01 Brick	North East	2.72
W002	DG Win	WT01 Brick	North East	2.72
W003	DG Win	WT01 Brick	North West	1.67
W004	DG Win	WT01 Brick	South East	2.72
W005	DG Win	WT01 Brick	South West	0.82
W006	DG Win	WT02 Tile hung	North East	1.50
W007	DG Win	WT02 Tile hung	North East	1.50
W008	DG Win	WT02 Tile hung	North East	1.50
W009	DG Win	WT02 Tile hung	South West	2.17
W010	DG Win	WT02 Tile hung	South West	0.82
W011	DG Win	WT02 Tile hung	South West	2.17
RL01	Roof Light - Flat	RT03 - Flat Roof	South West	1.08

0

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	21.37	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	15.40	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	41.10	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	40.97	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	32.10	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	18.30	0.06	0.06 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.24	0.24 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	17.07	0.06	0.06 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	34.41	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	13.21	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	8.87	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	7.47	0.24	0.24 Table R2	No

Y-value 0.06 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
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

Summary for Input Data

Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Test Method

22.0 Lighting
No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1

Percentage of Heat %

Fuel Type

SAP Code

In Winter

In Summer

Model Name

Manufacturer

Controls SAP Code

Controls description

Delayed Start Stat

Burner Control

Flue Type

Fan Assisted Flue

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Boiler Interlock

25.0 Main Heating 2

26.0 Heat Networks

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

28.1 Showers

Summary for Input Data



Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Cylinder Volume	200.00 L
Loss	1.72 kWh/day
Pipes insulation	All accessible pipework insulated

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

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

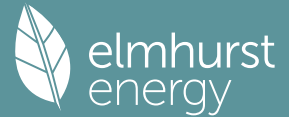
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT02				Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref				
Plot Address					SAP Version	10.2
SAP Rating	85 B	DER	11.72	TER	10.15	
Environmental	88 B	% DER < TER				-15.47
CO ₂ Emissions (t/year)	1.51	DFEE	43.02	TFEE	44.74	
Compliance Check	See BREL	% DFEE < TFEE				3.86
% DPER < TPER	-25.95	DPER	67.12	TPER	53.29	
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC					

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	78.0500 (1b)	x 2.6100 (2b)	= 203.7105 (1b) - (3b)
First floor	68.9000 (1c)	x 2.6900 (2c)	= 185.3410 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	146.9500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 389.0515 (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)											
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			30.7500	1.1450	35.2099		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof Light - Flat			1.0800	1.1450	1.2366		(27a)
FT01			78.0500	0.1300	10.1465		(28a)
WT01 Brick	106.9300	23.1900	83.7400	0.1800	15.0732		(29a)
WT02 Tile hung	95.1500	9.6600	85.4900	0.1800	15.3882		(29a)
RT01	68.9000		68.9000	0.1100	7.5790		(30)
RT03 - Flat Roof	9.1500	1.0800	8.0700	0.1100	0.8877		(30)
Total net area of external elements Aum(A, m ²)			358.1800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		87.6212		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

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E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	21.3700	0.0500	1.0685
E3 Sill	15.4000	0.0500	0.7700
E4 Jamb	41.1000	0.0500	2.0550
E5 Ground floor (normal)	40.9700	0.1600	6.5552
E6 Intermediate floor within a dwelling	32.1000	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	18.3000	0.0600	1.0980
E11 Eaves (insulation at rafter level)	0.0000	0.2400	0.0000
E12 Gable (insulation at ceiling level)	17.0700	0.0600	1.0242
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000
E16 Corner (normal)	34.4100	0.0900	3.0969
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	8.8700	0.5600	4.9672
E24 Eaves (insulation at ceiling level - inverted)	7.4700	0.2400	1.7928
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			21.2389 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	108.8601 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)			
(38)m	Jan	Feb	Mar
Heat transfer coeff	34.2232	33.8139	33.4047
Average = Sum(39)m / 12 =	143.0832	142.6740	142.2648
	Apr	May	Jun
	31.3585	30.9493	28.9031
	Jul	Aug	Sep
	28.9031	28.4939	29.7216
	Oct	Nov	Dec
	30.9493	31.7678	32.5862 (38)
	139.8094	140.6278	141.4463 (39)
	140.1163		
HLP	Jan	Feb	Mar
HLP (average)	0.9737	0.9709	0.9681
Days in mont	31	28	31
	Apr	May	Jun
	0.9542	0.9514	0.9375
	Jul	Aug	Sep
	0.9375	0.9347	0.9431
	Oct	Nov	Dec
	0.9514	0.9570	0.9625 (40)
			0.9535
			31

4. Water heating energy requirements (kWh/year)

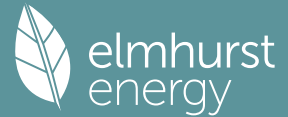
Assumed occupancy												2.9293 (42)
Hot water usage for mixer showers												
Hot water usage for baths	73.3348	72.2327	70.6268	67.5541	65.2865	62.7578	61.3204	62.9142	64.6613	67.3764	70.5151	73.0538 (42a)
Hot water usage for other uses	31.6596	31.1894	30.5273	29.3064	28.3923	27.3786	26.8311	27.4886	28.2045	29.2891	30.5351	31.5526 (42b)
Average daily hot water use (litres/day)	44.6291	43.0062	41.3834	39.7605	38.1376	36.5147	36.5147	38.1376	39.7605	41.3834	43.0062	44.6291 (42c)
												137.5376 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	149.6235	146.4284	142.5374	136.6210	131.8164	126.6511	124.6662	128.5404	132.6263	138.0489	144.0565	149.2355 (44)
Energy content (annual)	236.9671	208.5120	219.0747	187.0273	177.4502	155.7323	150.7730	159.1599	163.5414	187.3311	205.2348	233.6667 (45)
Distribution loss (46)m = 0.15 x (45)m	35.5451	31.2768	32.8612	28.0541	26.6175	23.3598	22.6160	23.8740	24.5312	28.0997	30.7852	35.0500 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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	303.0578	268.2069	285.1655	250.9861	243.5410	219.6911	216.8638	225.2506	227.5002	253.4218	269.1936	299.7575 (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	303.0578	268.2069	285.1655	250.9861	243.5410	219.6911	216.8638	225.2506	227.5002	253.4218	269.1936	299.7575 (64)
12Total per year (kWh/year)												3062.6360 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	131.6642	117.0862	125.7149	113.3536	111.8748	102.9480	103.0046	105.7933	105.5446	115.1602	119.4076	130.5668 (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	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	160.0877	177.2400	160.0877	165.4240	160.0877	165.4240	160.0877	160.0877	165.4240	160.0877	165.4240	160.0877 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	317.1850	320.4764	312.1822	294.5249	272.2356	251.2869	237.2919	234.0005	242.2947	259.9520	282.2412	303.1900 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726 (71)
Water heating gains (Table 5)	176.9679	174.2353	168.9717	157.4356	150.3694	142.9834	138.4471	142.1952	146.5897	154.7852	165.8439	175.4930 (72)
Total internal gains	724.1804	741.8915	711.1814	687.3242	652.6324	626.6340	602.7664	603.2232	621.2480	644.7646	683.4489	708.7104 (73)

6. Solar gains

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[Jan]	Area m2				Solar flux Table 6a W/m2	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d		Gains W
Northeast	9.9400				11.2829	0.6300		0.7000		0.7700		34.2752 (75)
Southeast	2.7200				36.7938	0.6300	0.7000	0.7000		0.7700		30.5855 (77)
Southwest	16.4200				36.7938	0.6300	0.7000	0.7000		0.7700		184.6375 (79)
Northwest	1.6700				11.2829	0.6300	0.7000	0.7000		0.7700		5.7585 (81)
Southwest	1.0800				26.0000	0.6300	0.7000	0.7000		1.0000		11.1450 (82)
Solar gains	266.4018	471.2416	689.5737	926.9285	1102.5572	1122.3779	1070.5623	935.6159	771.3273	533.0542	322.3060	225.8814 (83)
Total gains	990.5822	1213.1330	1400.7550	1614.2526	1755.1897	1749.0119	1673.3287	1538.8391	1392.5754	1177.8188	1005.7548	934.5918 (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	71.3212	71.5257	71.7315	72.7782	72.9913	74.0754	74.0754	74.2961	73.6379	72.9913	72.5664	72.1465
alpha	5.7547	5.7684	5.7821	5.8519	5.8661	5.9384	5.9384	5.9531	5.9092	5.8661	5.8378	5.8098
util living area												
	0.9963	0.9880	0.9631	0.8744	0.7029	0.4998	0.3617	0.4094	0.6614	0.9278	0.9899	0.9973 (86)
MIT	20.1533	20.3249	20.5424	20.7852	20.9094	20.9434	20.9472	20.9468	20.9275	20.7420	20.4029	20.1285 (87)
Th 2	20.1053	20.1077	20.1100	20.1217	20.1240	20.1358	20.1358	20.1381	20.1311	20.1240	20.1193	20.1147 (88)
util rest of house												
	0.9951	0.9843	0.9521	0.8429	0.6483	0.4342	0.2910	0.3333	0.5881	0.9013	0.9861	0.9965 (89)
MIT 2	19.1108	19.3306	19.6036	19.8987	20.0271	20.0664	20.0685	20.0708	20.0514	19.8594	19.4406	19.0868 (90)
Living area fraction									fLA = Living area / (4) =			0.1075 (91)
MIT	19.2229	19.4375	19.7046	19.9940	20.1219	20.1607	20.1630	20.1650	20.1456	19.9543	19.5441	19.1988 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2229	19.4375	19.7046	19.9940	20.1219	20.1607	20.1630	20.1650	20.1456	19.9543	19.5441	19.1988 (93)
8. Space heating requirement												
Utilisation	0.9935	0.9807	0.9460	0.8378	0.6482	0.4362	0.2932	0.3357	0.5894	0.8951	0.9828	0.9952 (94)
Useful gains	984.1546	1189.6833	1325.1414	1352.3959	1137.6312	762.8512	490.6108	516.6191	820.7203	1054.2558	988.5006	930.1084 (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	2135.2143	2074.1200	1878.5448	1555.5869	1177.4665	766.0599	490.8492	517.1399	837.8044	1307.8239	1749.9806	2121.5268 (97)
Space heating kWh	856.3884	594.3415	411.7321	146.2975	29.6374	0.0000	0.0000	0.0000	0.0000	188.6546	548.2656	886.4153 (98a)
Space heating requirement - total per year (kWh/year)												3661.7324
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	856.3884	594.3415	411.7321	146.2975	29.6374	0.0000	0.0000	0.0000	0.0000	188.6546	548.2656	886.4153 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3661.7324
Space heating per m2	(98c) / (4) =											24.9182 (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 %)												87.5000 (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	856.3884	594.3415	411.7321	146.2975	29.6374	0.0000	0.0000	0.0000	0.0000	188.6546	548.2656	886.4153 (98)
Space heating efficiency (main heating system 1)	87.5000	87.5000	87.5000	87.5000	87.5000	0.0000	0.0000	0.0000	0.0000	87.5000	87.5000	87.5000 (210)
Space heating fuel (main heating system)	978.7296	679.2474	470.5510	167.1972	33.8713	0.0000	0.0000	0.0000	0.0000	215.6053	626.5893	1013.0460 (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	303.0578	268.2069	285.1655	250.9861	243.5410	219.6911	216.8638	225.2506	227.5002	253.4218	269.1936	299.7575 (64)
Water heating requirement	303.0578	268.2069	285.1655	250.9861	243.5410	219.6911	216.8638	225.2506	227.5002	253.4218	269.1936	299.7575 (64)
Efficiency of water heater (217)m	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000 (216)
Fuel for water heating, kWh/month	346.3518	306.5222	325.9034	286.8413	278.3326	251.0756	247.8443	257.4293	260.0003	289.6249	307.6499	342.5800 (219)
Space cooling fuel requirement	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	43.5524	39.3377	43.5524	42.1475	43.5524	42.1475	43.5524	43.5524	42.1475	43.5524	42.1475	43.5524 (231)
Lighting	32.5832	26.1394	23.5357	17.2432	13.3192	10.8819	12.1502	15.7933	20.5139	26.9154	30.4008	33.4888 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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)

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Annual totals kWh/year	
Space heating fuel - main system 1	4184.8370 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	92.5000
Water heating fuel used	3500.1555 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)	
mechanical ventilation fans (SFP = 0.9940)	471.7950 (230a)
central heating pump	41.0000 (230c)
Total electricity for the above, kWh/year	512.7950 (231)
Electricity for lighting (calculated in Appendix L)	262.9650 (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	8460.7524 (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	4184.8370	0.2100	878.8158	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3500.1555	0.2100	735.0326	(264)
Space and water heating			1613.8484	(265)
Pumps, fans and electric keep-hot	512.7950	0.1387	71.1310	(267)
Energy for lighting	262.9650	0.1443	37.9540	(268)
Total CO2, kg/year			1722.9334	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			11.7200	(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	4184.8370	1.1300	4728.8658	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3500.1555	1.1300	3955.1757	(278)
Space and water heating			8684.0415	(279)
Pumps, fans and electric keep-hot	512.7950	1.5128	775.7562	(281)
Energy for lighting	262.9650	1.5338	403.3445	(282)
Total Primary energy kWh/year			9863.1422	(286)
Dwelling Primary energy Rate (DPER)			67.1200	(287)

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

1. Overall dwelling characteristics

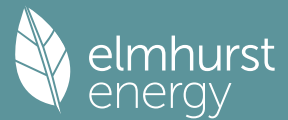
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	78.0500 (1b)	x 2.6100 (2b)	= 203.7105	(1b) - (3b)
First floor	68.9000 (1c)	x 2.6900 (2c)	= 185.3410	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	146.9500			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 389.0515	(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	4 * 10 =	40.0000	(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) =	40.0000 / (5) =	0.1028	(8)
Pressure test	Yes		
Pressure Test Method	Blower Door		
Measured/design AP50	5.0000		(17)
Infiltration rate	0.3528		(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) =	0.2999	(21)

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

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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												
	0.3824	0.3749	0.3674	0.3299	0.3224	0.2849	0.2849	0.2774	0.2999	0.3224	0.3374	0.3524 (22b)
Effective ac	0.5731	0.5703	0.5675	0.5544	0.5520	0.5406	0.5406	0.5385	0.5450	0.5520	0.5569	0.5621 (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			2.1000	1.0000	2.1000		(26)
TER Opening Type			30.7500	1.1450	35.2099		(27)
TER Roof Light			1.0800	1.5918	2.1838		(27a)
FT01			78.0500	0.1300	10.1465		(28a)
WT01 Brick	106.9300	23.1900	83.7400	0.1800	15.0732		(29a)
WT02 Tile hung	95.1500	9.6600	85.4900	0.1800	15.3882		(29a)
RT01	68.9000		68.9000	0.1100	7.5790		(30)
RT03 - Flat Roof	9.1500	1.0800	8.0700	0.1100	0.8877		(30)
Total net area of external elements Aum(A, m2)			358.1800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	88.5683		(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	21.3700	0.0500	1.0685
E3 Sill	15.4000	0.0500	0.7700
E4 Jamb	41.1000	0.0500	2.0550
E5 Ground floor (normal)	40.9700	0.1600	6.5552
E6 Intermediate floor within a dwelling	32.1000	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	18.3000	0.0600	1.0980
E11 Eaves (insulation at rafter level)	0.0000	0.0400	0.0000
E12 Gable (insulation at ceiling level)	17.0700	0.0600	1.0242
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000
E16 Corner (normal)	34.4100	0.0900	3.0969
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	8.8700	0.5600	4.9672
E24 Eaves (insulation at ceiling level - inverted)	7.4700	0.2400	1.7928

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

21.2389 (36)

Point Thermal Bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 109.8072 (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	73.5786	73.2142	72.8570	71.1791	70.8652	69.4039	69.4039	69.1332	69.9668	70.8652	71.5003	72.1642 (38)
Heat transfer coeff	183.3859	183.0215	182.6642	180.9864	180.6725	179.2111	179.2111	178.9405	179.7740	180.6725	181.3075	181.9714 (39)
Average = Sum(39)m / 12 =												180.9849

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2479	1.2455	1.2430	1.2316	1.2295	1.2195	1.2195	1.2177	1.2234	1.2295	1.2338	1.2383 (40)
HLP (average)												1.2316
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9293 (42)
Hot water usage for mixer showers	73.3348	72.2327	70.6268	67.5541	65.2865	62.7578	61.3204	62.9142	64.6613	67.3764	70.5151	73.0538 (42a)
Hot water usage for baths	31.6596	31.1894	30.5273	29.3064	28.3923	27.3786	26.8311	27.4886	28.2045	29.2891	30.5351	31.5526 (42b)
Hot water usage for other uses	44.6291	43.0062	41.3834	39.7605	38.1376	36.5147	36.5147	38.1376	39.7605	41.3834	43.0062	44.6291 (42c)
Average daily hot water use (litres/day)												137.5376 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	149.6235	146.4284	142.5374	136.6210	131.8164	126.6511	124.6662	128.5404	132.6263	138.0489	144.0565	149.2355 (44)
Energy conte	236.9671	208.5120	219.0747	187.0273	177.4502	155.7323	150.7730	159.1599	163.5414	187.3311	205.2348	233.6667 (45)
Energy content (annual)												2284.4706

Distribution loss (46)m = 0.15 x (45)m

35.5451 31.2768 32.8612 28.0541 26.6175 23.3598 22.6160 23.8740 24.5312 28.0997 30.7852 35.0500 (46)

Water storage loss (or HIU loss):

Store volume 200.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day): 1.6525 (48)

Temperature factor from Table 2b 0.5400 (49)

Enter (49) or (54) in (55) 0.8924 (55)

Total storage loss 27.6637 24.9865 27.6637 26.7713 27.6637 26.7713 27.6637 27.6637 26.7713 27.6637 26.7713 27.6637 (56)

If cylinder contains dedicated solar storage 27.6637 24.9865 27.6637 26.7713 27.6637 26.7713 27.6637 27.6637 26.7713 27.6637 26.7713 27.6637 (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 287.8931 254.5098 270.0008 236.3106 228.3763 205.0156 201.6991 210.0859 212.8247 238.2571 254.5181 284.5928 (62)

WWHRS -33.5256 -29.6503 -31.0481 -25.7091 -23.9599 -20.5027 -19.2180 -20.4364 -21.2129 -25.0076 -28.3306 -32.9048 (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 (64a)

Output from w/h 254.3675 224.8594 238.9527 210.6016 204.4164 184.5129 182.4811 189.6495 191.6119 213.2495 226.1875 251.6880 (64)

Total per year (kWh/year) 2572.5781 (64)

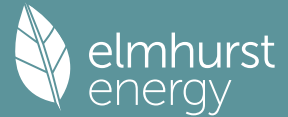
Electric shower(s) 2573 (64)

0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month 119.5324 106.1284 113.5832 101.6132 99.7431 91.2076 90.8729 93.6615 93.8042 103.0284 107.6672 118.4350 (65)

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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	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	160.0877	177.2400	160.0877	165.4240	160.0877	165.4240	160.0877	160.0877	165.4240	160.0877	165.4240	160.0877 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	317.1850	320.4764	312.1822	294.5249	272.2356	251.2869	237.2919	234.0005	242.2947	259.9520	282.2412	303.1900 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726 (71)
Water heating gains (Table 5)	160.6618	157.9292	152.6656	141.1295	134.0633	126.6773	122.1410	125.8891	130.2836	138.4791	149.5378	159.1869 (72)
Total internal gains	707.8743	725.5853	694.8752	671.0180	636.3263	610.3279	586.4603	586.9170	604.9419	628.4585	667.1427	692.4043 (73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W		
Northeast					9.9400	11.2829	0.6300	0.7000	0.7700	34.2752 (75)		
Southeast					2.7200	36.7938	0.6300	0.7000	0.7700	30.5855 (77)		
Southwest					16.4200	36.7938	0.6300	0.7000	0.7700	184.6375 (79)		
Northwest					1.6700	11.2829	0.6300	0.7000	0.7700	5.7585 (81)		
Southwest					1.0800	26.0000	0.6300	0.7000	1.0000	11.1450 (82)		
Solar gains	266.4018	471.2416	689.5737	926.9285	1102.5572	1122.3779	1070.5623	935.6159	771.3273	533.0542	322.3060	225.8814 (83)
Total gains	974.2761	1196.8269	1384.4489	1597.9465	1738.8836	1732.7058	1657.0226	1522.5330	1376.2693	1161.5127	989.4487	918.2857 (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	55.6469	55.7577	55.8668	56.3847	56.4827	56.9432	56.9432	57.0294	56.7649	56.4827	56.2848	56.0795
alpha	4.7098	4.7172	4.7245	4.7590	4.7655	4.7962	4.7962	4.8020	4.7843	4.7655	4.7523	4.7386
util living area	0.9969	0.9915	0.9772	0.9279	0.8121	0.6279	0.4687	0.5273	0.7815	0.9588	0.9928	0.9977 (86)
MIT	19.5012	19.7380	20.0705	20.4917	20.8072	20.9575	20.9914	20.9854	20.8813	20.4497	19.8951	19.4629 (87)
Th 2	19.8818	19.8838	19.8857	19.8948	19.8965	19.9044	19.9044	19.9059	19.9014	19.8965	19.8931	19.8895 (88)
util rest of house	0.9958	0.9886	0.9693	0.9033	0.7543	0.5343	0.3557	0.4086	0.6968	0.9396	0.9899	0.9969 (89)
MIT 2	18.1462	18.4493	18.8703	19.3908	19.7403	19.8814	19.9019	19.9010	19.8239	19.3537	18.6576	18.1026 (90)
Living area fraction	18.2919	18.5879	18.9994	19.5091	19.8550	19.9971	20.0190	20.0176	19.9376	19.4715	18.7906	18.2489 (91)
MIT	18.2919	18.5879	18.9994	19.5091	19.8550	19.9971	20.0190	20.0176	19.9376	19.4715	18.7906	18.2489 (92)
Temperature adjustment												0.0000
adjusted MIT	18.2919	18.5879	18.9994	19.5091	19.8550	19.9971	20.0190	20.0176	19.9376	19.4715	18.7906	18.2489 (93)

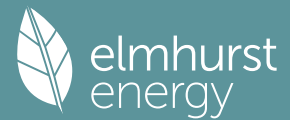
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9935	0.9837	0.9607	0.8927	0.7518	0.5426	0.3678	0.4211	0.7000	0.9297	0.9855	0.9950 (94)
Useful gains	967.9336	1177.3722	1330.0704	1426.5628	1307.3756	940.2207	609.4457	641.1683	963.3942	1079.8352	975.1473	913.6745 (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	2565.9162	2505.1711	2283.1843	1920.1114	1473.3883	967.2229	612.7256	647.3356	1049.4432	1602.8444	2119.6017	2556.4910 (97)
Space heating kWh	1188.8990	892.2809	709.1168	355.3550	123.5135	0.0000	0.0000	0.0000	0.0000	389.1188	824.0072	1222.2555 (98a)
Space heating requirement - total per year (kWh/year)												5704.5466
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	1188.8990	892.2809	709.1168	355.3550	123.5135	0.0000	0.0000	0.0000	0.0000	389.1188	824.0072	1222.2555 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5704.5466
Space heating per m2										(98c) / (4) =		38.8196 (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	1188.8990	892.2809	709.1168	355.3550	123.5135	0.0000	0.0000	0.0000	0.0000	389.1188	824.0072	1222.2555 (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)	1288.0813	966.7182	768.2739	385.0000	133.8174	0.0000	0.0000	0.0000	0.0000	421.5805	892.7488	1324.2204 (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)

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Water heating													
Water heating requirement	254.3675	224.8594	238.9527	210.6016	204.4164	184.5129	182.4811	189.6495	191.6119	213.2495	226.1875	251.6880 (64)	
Efficiency of water heater												79.8000 (216)	
(217)m	87.0693	86.8289	86.3456	85.2233	82.9672	79.8000	79.8000	79.8000	79.8000	85.3906	86.6941	87.1222 (217)	
Fuel for water heating, kWh/month	292.1437	258.9684	276.7399	247.1172	246.3823	231.2192	228.6731	237.6561	240.1151	249.7341	260.9029	288.8909 (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	7.0685	7.3041	7.0685	7.3041	7.3041 (231)	
Lighting	33.2631	26.6849	24.0268	17.6030	13.5971	11.1089	12.4037	16.1228	20.9420	27.4770	31.0352	34.1875 (232)	
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-67.0138	-91.5674	-127.5811	-138.8420	-145.8512	-134.6448	-132.8112	-127.1243	-116.7243	-102.3077	-72.5593	-58.2699 (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	-47.2668	-98.1757	-192.9227	-286.6889	-376.2522	-377.1550	-372.8660	-317.1192	-234.2341	-139.5440	-62.8072	-37.4881 (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												6180.4406 (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												3058.5430 (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)												268.4520 (232)	
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3857.8168 (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												5735.6188 (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	6180.4406	0.2100	1297.8925 (261)	
Total CO2 associated with community systems			0.0000 (373)	
Water heating (other fuel)	3058.5430	0.2100	642.2940 (264)	
Space and water heating			1940.1865 (265)	
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)	
Energy for lighting	268.4520	0.1443	38.7459 (268)	
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1315.2969	0.1353	-177.9467	
PV Unit electricity exported	-2542.5199	0.1262	-320.8757	
Total			-498.8224 (269)	
Total CO2, kg/year			1492.0394 (272)	
EPC Target Carbon Dioxide Emission Rate (TER)			10.1500 (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	6180.4406	1.1300	6983.8978 (275)	
Total CO2 associated with community systems			0.0000 (473)	
Water heating (other fuel)	3058.5430	1.1300	3456.1536 (278)	
Space and water heating			10440.0514 (279)	
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)	
Energy for lighting	268.4520	1.5338	411.7606 (282)	
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1315.2969	1.5000	-1973.0091	
PV Unit electricity exported	-2542.5199	0.4633	-1177.8679	
Total			-3150.8770 (283)	
Total Primary energy kWh/year			7831.0359 (286)	
Target Primary Energy Rate (TPER)			53.2900 (287)	

Summary for Input Data



Plot Reference	AT03	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	85 B	DER	11.86	TER	10.03
Environmental	88 B	% DER < TER			-18.25
CO ₂ Emissions (t/year)	1.45	DFEE	42.27	TFEE	43.71
Compliance Check	See BREL	% DFEE < TFEE			3.30
% DPER < TPER	-28.91	DPER	67.78	TPER	52.58

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor: 1st Storey:	Heat Loss Perimeter 39.63 m 32.18 m	Internal Floor Area 76.25 m² 62.89 m²	Average Storey Height 2.40 m 2.69 m
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8.0 Living Area	15.64	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		181.68	141.44	0.00	None	40.24	Enter Gross Area

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	64.32	64.32	None	0.00	Enter Gross Area	0.00
	RT03 - Flat Roof	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	11.93	10.85	None	0.00	Enter Gross Area	1.08

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	76.25

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof Light - Flat	Manufacturer	Roof Light	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings	Name	Opening Type	Location	Orientation	Area (m²)	Pitch
	D001	Solid door	WT01 Brick	North	2.10	
	D002	DG Win	WT01 Brick	South	5.22	

Summary for Input Data

D004	DG Win	WT01 Brick	South	5.22	
W001	DG Win	WT01 Brick	North	2.72	
W002	DG Win	WT01 Brick	North	2.72	
W003	DG Win	WT01 Brick	East	2.72	
W004	DG Win	WT01 Brick	South East	1.06	
W005	DG Win	WT01 Brick	East	2.86	
W006	DG Win	WT01 Brick	North East	1.06	
W007	DG Win	WT01 Brick	West	1.68	
W008	DG Win	WT01 Brick	North	1.48	
W009	DG Win	WT01 Brick	North	1.48	
W010	DG Win	WT01 Brick	North	1.48	
W011	DG Win	WT01 Brick	East	2.17	
RL01	Roof Light - Flat	RT03 - Flat Roof	South	1.08	0
D003	DG Win	WT01 Brick	South	1.80	
W012	DG Win	WT01 Brick	East	1.48	
W013	DG Win	WT01 Brick	South	2.17	
W014	DG Win	WT01 Brick	South	0.82	

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	26.23	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	19.36	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	53.80	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	39.63	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	28.62	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	16.12	0.06	0.06 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	19.38	0.06	0.06 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	22.76	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	2.40	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	10.26	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	7.76	0.24	0.24 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
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

Summary for Input Data

Number of blocked chimneys	0	
Number of intermittent extract fans	0	
Number of passive vents	0	
Number of flueless gas fires	0	

21.0 Fixed Cooling System	No	
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22.0 Pressure Testing	Yes	
Designed AP ₅₀	3.00	m ³ /(h.m ²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting	No	
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1	Manufacturer	
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	102	
In Winter	92.50	
In Summer	92.50	
Model Name		
Manufacturer		
Controls SAP Code	2110	
Controls description	Time and temperature zone control by arrangement	
Delayed Start Stat	No	
Burner Control	Modulating	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Unknown	
Boiler Interlock	No	

25.0 Main Heating 2	None	
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26.0 Heat Networks	None	
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27.0 Secondary Heating	None	
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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 mains	
Bath Count	1	

Summary for Input Data

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

	None
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34.0 Small-scale Hydro

	None
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Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

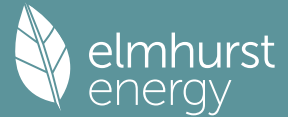
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT03				Issued on Date	07/05/2026	
Assessment Reference	Be Lean			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	85 B	DER	11.86	TER	10.03		
Environmental	88 B	% DER < TER				-18.25	
CO ₂ Emissions (t/year)	1.45	DFEE	42.27	TFEE	43.71		
Compliance Check	See BREL	% DFEE < TFEE				3.30	
% DPER < TPER	-28.91	DPER	67.78	TPER	52.58		
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	76.2500 (1b)	x 2.4000 (2b)	= 183.0000 (1b) - (3b)
First floor	62.8900 (1c)	x 2.6900 (2c)	= 169.1741 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	139.1400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 352.1741 (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											0 * 10 =	0.0000 (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) =											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)
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	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												
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			38.1400	1.1450	43.6718		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof Light - Flat			1.0800	1.1450	1.2366		(27a)
FT01			76.2500	0.1300	9.9125		(28a)
WT01 Brick	181.6800	40.2400	141.4400	0.1800	25.4592		(29a)
RT01	64.3200		64.3200	0.1100	7.0752		(30)
RT03 - Flat Roof	11.9300	1.0800	10.8500	0.1100	1.1935		(30)
Total net area of external elements Aum(A, m ²)			334.1800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	90.6488		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				0.0000	0.0500	0.0000	

Full SAP Calculation Printout



E2 Other lintels (including other steel lintels)	26.2300	0.0500	1.3115
E3 Sill	19.3600	0.0500	0.9680
E4 Jamb	53.8000	0.0500	2.6900
E5 Ground floor (normal)	39.6300	0.1600	6.3408
E6 Intermediate floor within a dwelling	28.6200	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	16.1200	0.0600	0.9672
E12 Gable (insulation at ceiling level)	19.3800	0.0600	1.1628
E16 Corner (normal)	22.7600	0.0900	2.0484
E17 Corner (inverted - internal area greater than external area)	2.4000	-0.0900	-0.2160
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	10.2600	0.5600	5.7456
E24 Eaves (insulation at ceiling level - inverted)	7.7600	0.2400	1.8624
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			22.8807 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	113.5295 (37)

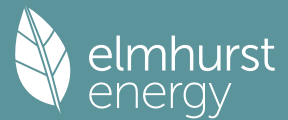
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	30.9792	30.6088	30.2383	28.3861	28.0157	26.1635	26.1635	25.7930	26.9043	28.0157	28.7566	29.4974 (38)
Average = Sum(39)m / 12 =	144.5087	144.1383	143.7678	141.9156	141.5452	139.6930	139.6930	139.3225	140.4338	141.5452	142.2861	143.0269 (39)
												141.8230
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0386	1.0359	1.0333	1.0199	1.0173	1.0040	1.0040	1.0013	1.0093	1.0173	1.0226	1.0279 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.9154 (42)
Hot water usage for mixer showers	73.1020	72.0034	70.4026	67.3397	65.0793	62.5585	61.1258	62.7145	64.4560	67.1625	70.2913	72.8219 (42a)
Hot water usage for baths	31.5595	31.0908	30.4307	29.2138	28.3025	27.2921	26.7463	27.4017	28.1153	29.1965	30.4386	31.4528 (42b)
Hot water usage for other uses	44.4869	42.8692	41.2515	39.6338	38.0161	36.3984	36.3984	38.0161	39.6338	41.2515	42.8692	44.4869 (42c)
Average daily hot water use (litres/day)												137.1009 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	149.1484	145.9634	142.0848	136.1872	131.3979	126.2490	124.2704	128.1323	132.2052	137.6106	143.5991	148.7617 (44)
Energy content (annual)	236.2147	207.8500	218.3791	186.4335	176.8868	155.2379	150.2943	158.6545	163.0222	186.7363	204.5832	232.9248 (45)
Distribution loss (46)m = 0.15 x (45)m	35.4322	31.1775	32.7569	27.9650	26.5330	23.2857	22.5441	23.7982	24.4533	28.0104	30.6875	34.9387 (46)
Water storage loss (or HIU loss):												200.0000 (47)
Store volume												1.7200 (48)
a) If manufacturer declared loss factor is known (kWh/day):												0.5400 (49)
Temperature factor from Table 2b												0.9288 (55)
Enter (49) or (54) in (55)												
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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	302.3054	267.5449	284.4699	250.3923	242.9776	219.1967	216.3851	224.7453	226.9810	252.8270	268.5420	299.0156 (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	302.3054	267.5449	284.4699	250.3923	242.9776	219.1967	216.3851	224.7453	226.9810	252.8270	268.5420	299.0156 (64)
12Total per year (kWh/year)												3055.3826 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	131.4140	116.8660	125.4837	113.1562	111.6875	102.7836	102.8455	105.6252	105.3719	114.9624	119.1909	130.3201 (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	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	155.5686	172.2366	155.5686	160.7542	155.5686	160.7542	155.5686	155.5686	160.7542	155.5686	160.7542	155.5686 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	308.4321	311.6327	303.5674	286.3973	264.7231	244.3525	230.7436	227.5431	235.6084	252.7785	274.4526	294.8233 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172 (71)
Water heating gains (Table 5)	176.6317	173.9078	168.6608	157.1614	150.1176	142.7550	138.2332	141.9694	146.3499	154.5194	165.5430	175.1614 (72)
Total internal gains	710.3638	727.5085	697.5282	674.0443	640.1407	614.5932	591.2768	591.8125	609.4439	632.5979	670.4813	695.2847 (73)

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

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North	9.8800	10.6334	0.6300	0.7000	0.7700	32.1071 (74)
Northeast	1.0600	11.2829	0.6300	0.7000	0.7700	3.6551 (75)
East	9.2300	19.6403	0.6300	0.7000	0.7700	55.4014 (76)
Southeast	1.0600	36.7938	0.6300	0.7000	0.7700	11.9194 (77)
South	15.2300	46.7521	0.6300	0.7000	0.7700	217.6068 (78)
West	1.6800	19.6403	0.6300	0.7000	0.7700	10.0839 (80)
South	1.0800	26.0000	0.6300	0.7000	1.0000	11.1450 (82)

Solar gains	341.9186	596.7357	851.5350	1108.9731	1287.7909	1297.6147	1243.1448	1107.4368	940.6549	669.2603	412.2202	290.8374 (83)
Total gains	1052.2825	1324.2442	1549.0632	1783.0174	1927.9316	1912.2079	1834.4216	1699.2493	1550.0988	1301.8582	1082.7015	986.1222 (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	66.8645	67.0363	67.2091	68.0862	68.2644	69.1696	69.1696	69.3535	68.8046	68.2644	67.9090	67.5572
alpha	5.4576	5.4691	5.4806	5.5391	5.5510	5.6113	5.6113	5.6236	5.5870	5.5510	5.5273	5.5038
util living area	0.9939	0.9795	0.9409	0.8307	0.6544	0.4640	0.3346	0.3762	0.6073	0.8943	0.9835	0.9956 (86)
MIT	20.1367	20.3393	20.5732	20.8043	20.9117	20.9407	20.9442	20.9439	20.9281	20.7618	20.4038	20.1039 (87)
Th 2	20.0513	20.0535	20.0557	20.0667	20.0690	20.0800	20.0800	20.0822	20.0756	20.0690	20.0645	20.0601 (88)
util rest of house	0.9920	0.9735	0.9247	0.7931	0.5979	0.3989	0.2649	0.3017	0.5332	0.8594	0.9776	0.9942 (89)
MIT 2	19.0457	19.3030	19.5919	19.8653	19.9730	20.0070	20.0089	20.0111	19.9947	19.8290	19.3957	19.0111 (90)
Living area fraction									fLA = Living area / (4) =			0.1124 (91)
MIT	19.1684	19.4195	19.7022	19.9708	20.0785	20.1120	20.1141	20.1160	20.0996	19.9338	19.5090	19.1339 (92)
Temperature adjustment												0.0000
adjusted MIT	19.1684	19.4195	19.7022	19.9708	20.0785	20.1120	20.1141	20.1160	20.0996	19.9338	19.5090	19.1339 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9895	0.9683	0.9175	0.7888	0.5985	0.4012	0.2675	0.3044	0.5352	0.8535	0.9730	0.9923 (94)
Useful gains	1041.2605	1282.2717	1421.2809	1406.4982	1153.8528	767.1856	490.6685	517.2682	829.5560	1111.1564	1053.4425	978.5291 (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	2148.6068	2092.8118	1898.0475	1571.1223	1185.9410	769.9846	490.8889	517.7188	842.5475	1321.1593	1765.6335	2135.9544 (97)
Space heating kWh	823.8656	544.6829	354.7143	118.5293	23.8736	0.0000	0.0000	0.0000	0.0000	156.2422	512.7775	861.1244 (98a)
Space heating requirement - total per year (kWh/year)												3395.8099
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	823.8656	544.6829	354.7143	118.5293	23.8736	0.0000	0.0000	0.0000	0.0000	156.2422	512.7775	861.1244 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3395.8099
Space heating per m2										(98c) / (4) =		24.4057 (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 %)												87.5000 (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	823.8656	544.6829	354.7143	118.5293	23.8736	0.0000	0.0000	0.0000	0.0000	156.2422	512.7775	861.1244 (98)
Space heating efficiency (main heating system 1)	87.5000	87.5000	87.5000	87.5000	87.5000	0.0000	0.0000	0.0000	0.0000	87.5000	87.5000	87.5000 (210)
Space heating fuel (main heating system)	941.5607	622.4948	405.3878	135.4621	27.2841	0.0000	0.0000	0.0000	0.0000	178.5625	586.0314	984.1422 (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	302.3054	267.5449	284.4699	250.3923	242.9776	219.1967	216.3851	224.7453	226.9810	252.8270	268.5420	299.0156 (64)
Efficiency of water heater (217)m	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	92.5000 (216)
Fuel for water heating, kWh/month	345.4919	305.7656	325.1084	286.1626	277.6887	250.5105	247.2972	256.8518	259.4068	288.9452	306.9051	341.7321 (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	39.7543	35.9071	39.7543	38.4719	39.7543	38.4719	39.7543	39.7543	38.4719	39.7543	38.4719	39.7543 (231)
Lighting	31.6634	25.4015	22.8713	16.7565	12.9432	10.5747	11.8072	15.3475	19.9348	26.1556	29.5427	32.5434 (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												

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Space heating fuel - main system 1	3880.9256	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	92.5000	
Water heating fuel used	3491.8659	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)		
mechanical ventilation fans (SFP = 0.9940)	427.0745	(230a)
central heating pump	41.0000	(230c)
Total electricity for the above, kWh/year	468.0745	(231)
Electricity for lighting (calculated in Appendix L)	255.5417	(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	8096.4077	(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	3880.9256	0.2100	814.9944 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3491.8659	0.2100	733.2918 (264)
Space and water heating			1548.2862 (265)
Pumps, fans and electric keep-hot	468.0745	0.1387	64.9277 (267)
Energy for lighting	255.5417	0.1443	36.8826 (268)
Total CO2, kg/year			1650.0965 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			11.8600 (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	3880.9256	1.1300	4385.4460 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3491.8659	1.1300	3945.8084 (278)
Space and water heating			8331.2544 (279)
Pumps, fans and electric keep-hot	468.0745	1.5128	708.1031 (281)
Energy for lighting	255.5417	1.5338	391.9584 (282)
Total Primary energy kWh/year			9431.3159 (286)
Dwelling Primary energy Rate (DPER)			67.7800 (287)

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

1. Overall dwelling characteristics

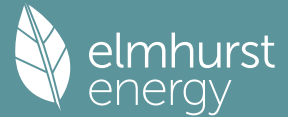
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	76.2500 (1b)	x 2.4000 (2b)	= 183.0000 (1b) - (3b)
First floor	62.8900 (1c)	x 2.6900 (2c)	= 169.1741 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	139.1400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	352.1741 (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	4 * 10 = 40.0000 (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) = 40.0000 / (5) = 0.1136 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3636 (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) = 0.3090 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)

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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												
Effective ac	0.3940	0.3863	0.3786	0.3399	0.3322	0.2936	0.2936	0.2859	0.3090	0.3322	0.3477	0.3631 (22b)
	0.5776	0.5746	0.5717	0.5578	0.5552	0.5431	0.5431	0.5409	0.5478	0.5552	0.5604	0.5659 (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			2.1000	1.0000	2.1000		(26)
TER Opening Type			31.7700	1.1450	36.3779		(27)
TER Roof Light			0.9000	1.5918	1.8199		(27a)
FT01			76.2500	0.1300	9.9125		(28a)
WT01 Brick	181.6800	33.8700	147.8100	0.1800	26.6058		(29a)
RT01	64.3200		64.3200	0.1100	7.0752		(30)
RT03 - Flat Roof	11.9300	0.9000	11.0300	0.1100	1.2133		(30)
Total net area of external elements Aum(A, m2)			334.1800				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	85.1045	(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000 (35)

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

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	26.2300	0.0500	1.3115
E3 Sill	19.3600	0.0500	0.9680
E4 Jamb	53.8000	0.0500	2.6900
E5 Ground floor (normal)	39.6300	0.1600	6.3408
E6 Intermediate floor within a dwelling	28.6200	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	16.1200	0.0600	0.9672
E12 Gable (insulation at ceiling level)	19.3800	0.0600	1.1628
E16 Corner (normal)	22.7600	0.0900	2.0484
E17 Corner (inverted - internal area greater than external area)	2.4000	-0.0900	-0.2160
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	10.2600	0.5600	5.7456
E24 Eaves (insulation at ceiling level - inverted)	7.7600	0.2400	1.8624
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			22.8807 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 107.9852 (37)

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

Point Thermal bridges

Total fabric heat loss

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	67.1307	66.7803	66.4369	64.8240	64.5222	63.1174	63.1174	62.8573	63.6586	64.5222	65.1327	65.7710 (38)
Average = Sum(39)m / 12 =	175.1159	174.7656	174.4222	172.8092	172.5075	171.1027	171.1027	170.8425	171.6438	172.5075	173.1179	173.7562 (39)
												172.8078

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.2586	1.2560	1.2536	1.2420	1.2398	1.2297	1.2297	1.2278	1.2336	1.2398	1.2442	1.2488 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9154 (42)
Hot water usage for mixer showers												
73.1020	72.0034	70.4026	67.3397	65.0793	62.5585	61.1258	62.7145	64.4560	67.1625	70.2913	72.8219	(42a)
Hot water usage for baths												
31.5595	31.0908	30.4307	29.2138	28.3025	27.2921	26.7463	27.4017	28.1153	29.1965	30.4386	31.4528	(42b)
Hot water usage for other uses												
44.4869	42.8692	41.2515	39.6338	38.0161	36.3984	36.3984	38.0161	39.6338	41.2515	42.8692	44.4869	(42c)
Average daily hot water use (litres/day)												137.1009 (43)
Daily hot water use												
149.1484	145.9634	142.0848	136.1872	131.3979	126.2490	124.2704	128.1323	132.2052	137.6106	143.5991	148.7617	(44)
Energy conte	236.2147	207.8500	218.3791	186.4335	176.8868	155.2379	150.2943	158.6545	163.0222	186.7363	204.5832	(45)
Energy content (annual)												
Distribution loss (46)m = 0.15 x (45)m												2277.2172
35.4322	31.1775	32.7569	27.9650	26.5330	23.2857	22.5441	23.7982	24.4533	28.0104	30.6875	34.9387	(46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6525 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8924 (55)
Total storage loss												
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)
If cylinder contains dedicated solar storage												
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month												
287.1407	253.8477	269.3052	235.7168	227.8129	204.5212	201.2204	209.5806	212.3055	237.6623	253.8665	283.8509	(62)
WWHRS	-33.4192	-29.5562	-30.9496	-25.6275	-23.8839	-20.4376	-19.1570	-20.3715	-21.1455	-24.9282	-28.2407	-32.8003 (63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
Output from w/h												
253.7215	224.2915	238.3556	210.0894	203.9290	184.0836	182.0634	189.2091	191.1600	212.7341	225.6258	251.0506	(64)
Total per year (kWh/year)												2566.3135 (64)
Electric shower(s)												2566 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
119.2822	105.9083	113.3519	101.4158	99.5557	91.0432	90.7137	93.4935	93.6315	102.8307	107.4505	118.1884	(65)

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

elmhurst
energy

6. Solar gains

7. Mean internal temperature (heating season)

8. Space heating requirement

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

Water heating

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Water heating requirement	253.7215	224.2915	238.3556	210.0894	203.9290	184.0836	182.0634	189.2091	191.1600	212.7341	225.6258	251.0506 (64)
Efficiency of water heater												79.8000 (216)
(217)m	86.9684	86.6954	86.1692	84.9999	82.7772	79.8000	79.8000	79.8000	79.8000	85.1281	86.5579	87.0273 (217)
Fuel for water heating, kWh/month	291.7398	258.7121	276.6134	247.1642	246.3591	230.6812	228.1496	237.1041	239.5488	249.8988	260.6646	288.4733 (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	32.3241	25.9316	23.3485	17.1061	13.2133	10.7953	12.0536	15.6677	20.3508	26.7013	30.1591	33.2225 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-65.4148	-89.3561	-124.4676	-135.4235	-142.2442	-131.3193	-129.5401	-124.0052	-113.8735	-99.8319	-70.8223	-56.8836 (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	-46.2302	-96.0111	-188.6447	-280.2938	-367.8184	-368.6773	-364.4752	-309.9930	-228.9910	-136.4422	-61.4224	-36.6660 (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												5673.0207 (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												3055.1090 (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)												260.8738 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-3768.8473 (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												5306.1563 (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	5673.0207	0.2100	1191.3343 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3055.1090	0.2100	641.5729 (264)
Space and water heating			1832.9072 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	260.8738	0.1443	37.6522 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1283.1821	0.1353	-173.6067
PV Unit electricity exported	-2485.6652	0.1262	-313.7120
Total			-487.3187 (269)
Total CO2, kg/year			1395.1699 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.0300 (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	5673.0207	1.1300	6410.5134 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3055.1090	1.1300	3452.2732 (278)
Space and water heating			9862.7866 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	260.8738	1.5338	400.1370 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1283.1821	1.5001	-1924.8533
PV Unit electricity exported	-2485.6652	0.4633	-1151.5724
Total			-3076.4257 (283)
Total Primary energy kWh/year			7316.5986 (286)
Target Primary Energy Rate (TPER)			52.5800 (287)

Summary for Input Data



Plot Reference	AT04	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	84 B	DER	12.83	TER	11.44
Environmental	89 B	% DER < TER			-12.15
CO ₂ Emissions (t/year)	1.08	DFEE	38.17	TFEE	39.70
Compliance Check	See BREL	% DFEE < TFEE			3.85
% DPER < TPER	-22.89	DPER	73.54	TPER	59.84

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2026
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Enter TMP value
Thermal Mass	250.00
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	28.90 m	46.52 m²	2.40 m
		28.93 m	46.52 m²	2.69 m

8.0 Living Area	17.10	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		56.88	47.24	0.00	None	9.64	Enter Gross Area
	WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		77.82	72.69	0.00	None	5.13	Enter Gross Area

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	46.52	46.52	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	46.52

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00

13.0 Openings	Name	Opening Type	Location	Orientation	Area (m²)	Pitch
	D001	Solid door	WT01 Brick	East	2.10	
	D002	DG Win	WT01 Brick	West	5.22	
	W001	DG Win	WT01 Brick	East	0.82	
	W002	DG Win	WT01 Brick	West	1.50	

Summary for Input Data

W003	DG Win	WT02 Tile hung	East	2.17
W004	DG Win	WT02 Tile hung	West	1.48
W005	DG Win	WT02 Tile hung	West	1.48

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	Calculate Bridges
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17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	9.70	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	6.22	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	20.40	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	28.93	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	28.93	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	19.28	0.06	0.06 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	9.64	0.06	0.06 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	20.36	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	0.00	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	0.00	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	0.00	0.24	0.24 Table R2	No

Y-value	0.04	W/m²K
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19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
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

21.0 Fixed Cooling System	No
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22.0 Pressure Testing	Yes	
Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa

Summary for Input Data

Test Method	Blower Door				
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22.0 Lighting

No Fixed Lighting	No				
	Name LEL	Efficacy 85.00	Power 10.00	Capacity 850.00	Count 20

24.0 Main Heating 1

Manufacturer	Manufacturer				
Percentage of Heat	100.00				%
Fuel Type	Mains gas				
SAP Code	102				
In Winter	92.50				
In Summer	92.50				
Model Name					
Manufacturer					
Controls SAP Code	2110				
Controls description	Time and temperature zone control by arrangement				
Delayed Start Stat	No				
Burner Control	Modulating				
Flue Type	Balanced				
Fan Assisted Flue	No				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators and Underfloor				
Underfloor Heating	Yes - Pipes in thin screed				
Flow Temperature	Unknown				
Boiler Interlock	No				

25.0 Main Heating 2

	None				
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26.0 Heat Networks

	None				
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27.0 Secondary Heating

	None				
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28.0 Water Heating

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 mains				
Bath Count	1				

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder				
Cylinder Stat	Yes				
Cylinder In Heated Space	Yes				
Independent Time Control	Yes				

Summary for Input Data

Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

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

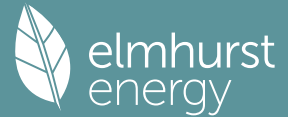
Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT04				Issued on Date	07/05/2026
Assessment Reference	Be Lean		Plot Type Ref			
Plot Address					SAP Version	10.2
SAP Rating	84 B	DER	12.83	TER	11.44	
Environmental	89 B	% DER < TER				-12.15
CO ₂ Emissions (t/year)	1.08	DFEE	38.17	TFEE	39.70	
Compliance Check	See BREL	% DFEE < TFEE				3.85
% DPER < TPER	-22.89	DPER	73.54	TPER	59.84	
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC					

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	46.5200 (1b)	x 2.4000 (2b)	= 111.6480 (1b) - (3b)
First floor	46.5200 (1c)	x 2.6900 (2c)	= 125.1388 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 236.7868 (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)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	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) =	79.2000 (23c)
Effective ac	0.2666 0.2634 0.2602 0.2442 0.2411 0.2251 0.2251 0.2219 0.2315 0.2411 0.2474 0.2538 (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							
DG Win			12.6700	1.1450	14.5076		(27)
Solid door			2.1000	1.0000	2.1000		(26)
FT01			46.5200	0.1300	6.0476		(28a)
WT01 Brick	56.8800	9.6400	47.2400	0.1800	8.5032		(29a)
WT02 Tile hung	77.8200	5.1300	72.6900	0.1800	13.0842		(29a)
RT01	46.5200		46.5200	0.1100	5.1172		(30)
Total net area of external elements Aum(A, m ²)			227.7400				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		49.3598		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)				9.7000	0.0500	0.4850	

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E3 Sill									6.2200	0.0500	0.3110	
E4 Jamb									20.4000	0.0500	1.0200	
E5 Ground floor (normal)									28.9300	0.1600	4.6288	
E6 Intermediate floor within a dwelling									28.9300	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)									19.2800	0.0600	1.1568	
E12 Gable (insulation at ceiling level)									9.6400	0.0600	0.5784	
E16 Corner (normal)									20.3600	0.0900	1.8324	
E17 Corner (inverted - internal area greater than external area)									0.0000	-0.0900	-0.0000	
E18 Party wall between dwellings									0.0000	0.0600	0.0000	
P1 Party wall - Ground floor									0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)									0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling									0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)									0.0000	0.1200	0.0000	
E15 Flat roof with parapet									0.0000	0.5600	0.0000	
E24 Eaves (insulation at ceiling level - inverted)									0.0000	0.2400	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)												10.0124 (36)
Point Thermal bridges												0.0000
Total fabric heat loss									(33) + (36) + (36a) =			59.3722 (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	20.8291	20.5800	20.3310	19.0856	18.8365	17.5912	17.5912	17.3421	18.0893	18.8365	19.3347	19.8328 (38)
Average = Sum(39)m / 12 =	80.2013	79.9523	79.7032	78.4578	78.2088	76.9634	76.9634	76.7144	77.4616	78.2088	78.7069	79.2051 (39)
												78.3956
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	0.8620	0.8593	0.8567	0.8433	0.8406	0.8272	0.8272	0.8245	0.8326	0.8406	0.8459	0.8513 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												

Assumed occupancy												2.6651 (42)
Hot water usage for mixer showers												
	68.9045	67.8690	66.3601	63.4730	61.3424	58.9664	57.6159	59.1134	60.7550	63.3061	66.2551	68.6405 (42a)
Hot water usage for baths												
	29.7544	29.3125	28.6902	27.5429	26.6837	25.7311	25.2165	25.8344	26.5072	27.5266	28.6976	29.6538 (42b)
Hot water usage for other uses												
	41.9232	40.3987	38.8742	37.3497	35.8252	34.3008	34.3008	35.8252	37.3497	38.8742	40.3987	41.9232 (42c)
Average daily hot water use (litres/day)												129.2266 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	140.5821	137.5802	133.9245	128.3656	123.8514	118.9983	117.1332	120.7731	124.6119	129.7069	135.3514	140.2175 (44)
Energy content (annual)	222.6476	195.9124	205.8370	175.7261	166.7278	146.3223	141.6624	149.5423	153.6590	176.0110	192.8329	219.5467 (45)
Distribution loss (46)m = 0.15 x (45)m												
	33.3971	29.3869	30.8755	26.3589	25.0092	21.9483	21.2494	22.4313	23.0488	26.4017	28.9249	32.9320 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss												
	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage												
	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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												
	288.7384	255.6072	271.9277	239.6849	232.8186	210.2811	207.7532	215.6331	217.6178	242.1018	256.7917	285.6374 (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												
	288.7384	255.6072	271.9277	239.6849	232.8186	210.2811	207.7532	215.6331	217.6178	242.1018	256.7917	285.6374 (64)
12Total per year (kWh/year)												2924.5929 (64)
Electric shower(s)												2925 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
												0.0000 (64a)
Heat gains from water heating, kWh/month												
	126.9029	112.8968	121.3134	109.5960	108.3096	99.8192	99.9754	102.5954	102.2586	111.3963	115.2840	125.8719 (65)

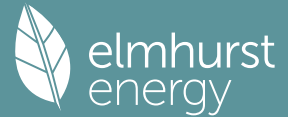
5. Internal gains (see Table 5 and 5a)												

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	133.1380	147.4027	133.1380	137.5759	133.1380	137.5759	133.1380	133.1380	137.5759	133.1380	137.5759	133.1380 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	244.5607	247.0985	240.7034	227.0889	209.9032	193.7510	182.9603	180.4225	186.8176	200.4321	217.6178	233.7700 (68)
Pumps, fans	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035 (71)
Total internal gains	170.5685	168.0011	163.0557	152.2166	145.5774	138.6378	134.3755	137.8971	142.0259	149.7262	160.1167	169.1826 (72)
	614.2434	628.4787	602.8733	582.8577	554.5948	532.9409	513.4500	514.4339	529.3957	549.2725	581.2867	602.0669 (73)

6. Solar gains												

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

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East	2.9900		19.6403		0.6300		0.7000		0.7700		17.9469 (76)	
West	9.6800		19.6403		0.6300		0.7000		0.7700		58.1025 (80)	

Solar gains	76.0494	148.7687	245.0009	357.3193	437.9082	448.2769	426.7779	366.5959	284.9462	176.5267	94.8247	62.5393 (83)
Total gains	690.2928	777.2474	847.8742	940.1770	992.5030	981.2178	940.2279	881.0298	814.3419	725.7991	676.1113	664.6063 (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	80.5611	80.8121	81.0646	82.3514	82.6136	83.9504	83.9504	84.2230	83.4105	82.6136	82.0908	81.5745
alpha	6.3707	6.3875	6.4043	6.4901	6.5076	6.5967	6.5967	6.6149	6.5607	6.5076	6.4727	6.4383
util living area	0.9928	0.9838	0.9592	0.8707	0.7042	0.4993	0.3599	0.4000	0.6415	0.9108	0.9826	0.9942 (86)
MIT	20.3548	20.4746	20.6389	20.8324	20.9262	20.9505	20.9527	20.9526	20.9415	20.8127	20.5589	20.3396 (87)
Th 2	20.1999	20.2022	20.2045	20.2160	20.2183	20.2298	20.2298	20.2321	20.2252	20.2183	20.2137	20.2091 (88)
util rest of house	0.9907	0.9792	0.9478	0.8404	0.6539	0.4405	0.2971	0.3335	0.5755	0.8818	0.9767	0.9925 (89)
MIT 2	19.4454	19.5984	19.8041	20.0398	20.1368	20.1681	20.1693	20.1717	20.1576	20.0251	19.7157	19.4338 (90)
Living area fraction									fLA = Living area / (4) =			0.1838 (91)
MIT	19.6125	19.7594	19.9575	20.1855	20.2819	20.3119	20.3133	20.3152	20.3017	20.1699	19.8707	19.6003 (92)
Temperature adjustment												0.0000
adjusted MIT	19.6125	19.7594	19.9575	20.1855	20.2819	20.3119	20.3133	20.3152	20.3017	20.1699	19.8707	19.6003 (93)

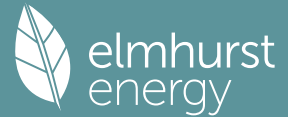
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9887	0.9760	0.9436	0.8391	0.6581	0.4468	0.3039	0.3407	0.5822	0.8797	0.9735	0.9908 (94)
Useful gains	682.4810	758.5564	800.0823	788.9320	653.1840	438.3871	285.7087	300.1916	474.0986	638.5131	658.1886	658.4743 (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	1228.0850	1188.0464	1072.6093	885.4365	671.1773	439.6051	285.7858	300.3520	480.3905	748.4500	1005.1397	1219.7783 (97)
Space heating kWh	405.9294	288.6173	202.7601	69.4833	13.3871	0.0000	0.0000	0.0000	0.0000	81.7930	249.8048	417.6101 (98a)
Space heating requirement - total per year (kWh/year)												1729.3851
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	405.9294	288.6173	202.7601	69.4833	13.3871	0.0000	0.0000	0.0000	0.0000	81.7930	249.8048	417.6101 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1729.3851
Space heating per m2										(98c) / (4) =		18.5875 (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 %)												87.5000 (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	405.9294	288.6173	202.7601	69.4833	13.3871	0.0000	0.0000	0.0000	0.0000	81.7930	249.8048	417.6101 (98)
Space heating efficiency (main heating system 1)	87.5000	87.5000	87.5000	87.5000	87.5000	0.0000	0.0000	0.0000	0.0000	87.5000	87.5000	87.5000 (210)
Space heating fuel (main heating system)	463.9193	329.8483	231.7258	79.4095	15.2995	0.0000	0.0000	0.0000	0.0000	93.4778	285.4912	477.2687 (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	288.7384	255.6072	271.9277	239.6849	232.8186	210.2811	207.7532	215.6331	217.6178	242.1018	256.7917	285.6374 (64)
Efficiency of water heater (217)m	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	92.5000 (216)
Fuel for water heating, kWh/month	329.9867	292.1226	310.7746	273.9256	266.0783	240.3212	237.4322	246.4378	248.7060	276.6877	293.4763	326.4428 (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	27.8700	25.1729	27.8700	26.9710	27.8700	26.9710	27.8700	27.8700	26.9710	27.8700	26.9710	27.8700 (231)
Lighting	27.0980	21.7390	19.5736	14.3404	11.0770	9.0500	10.1048	13.1346	17.0605	22.3843	25.2831	27.8511 (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												1976.4401 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												92.5000
Water heating fuel used												3342.3919 (219)
Space cooling fuel												0.0000 (221)

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Electricity for pumps and fans:	
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)	
mechanical ventilation fans (SFP = 0.9940)	287.1466 (230a)
central heating pump	41.0000 (230c)
Total electricity for the above, kWh/year	328.1466 (231)
Electricity for lighting (calculated in Appendix L)	218.6965 (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	5865.6751 (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	1976.4401	0.2100	415.0524 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3342.3919	0.2100	701.9023 (264)
Space and water heating			1116.9547 (265)
Pumps, fans and electric keep-hot	328.1466	0.1387	45.5180 (267)
Energy for lighting	218.6965	0.1443	31.5647 (268)
Total CO2, kg/year			1194.0374 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			12.8300 (273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1976.4401	1.1300	2233.3773 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3342.3919	1.1300	3776.9028 (278)
Space and water heating			6010.2801 (279)
Pumps, fans and electric keep-hot	328.1466	1.5128	496.4202 (281)
Energy for lighting	218.6965	1.5338	335.4439 (282)
Total Primary energy kWh/year			6842.1443 (286)
Dwelling Primary energy Rate (DPER)			73.5400 (287)

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

1. Overall dwelling characteristics

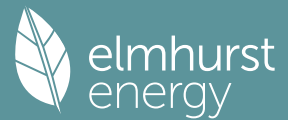
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	46.5200 (1b)	x 2.4000 (2b)	= 111.6480 (1b) - (3b)
First floor	46.5200 (1c)	x 2.6900 (2c)	= 125.1388 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	236.7868 (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) = 0.1267 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3767 (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) = 0.3202 (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	0.4082	0.4002	0.3922	0.3522	0.3442	0.3042	0.3042	0.2962	0.3202	0.3442	0.3602	0.3762 (22b)
Effective ac	0.5833	0.5801	0.5769	0.5620	0.5592	0.5463	0.5463	0.5439	0.5513	0.5592	0.5649	0.5708 (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			2.1000	1.0000	2.1000			(26)
TER Opening Type			12.6700	1.1450	14.5076			(27)
FT01			46.5200	0.1300	6.0476			(28a)
WT01 Brick	56.8800	9.6400	47.2400	0.1800	8.5032			(29a)
WT02 Tile hung	77.8200	5.1300	72.6900	0.1800	13.0842			(29a)
RT01	46.5200		46.5200	0.1100	5.1172			(30)
Total net area of external elements Aum(A, m2)			227.7400					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	49.3598		(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	9.7000	0.0500	0.4850	
E3 Sill	6.2200	0.0500	0.3110	
E4 Jamb	20.4000	0.0500	1.0200	
E5 Ground floor (normal)	28.9300	0.1600	4.6288	
E6 Intermediate floor within a dwelling	28.9300	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	19.2800	0.0600	1.1568	
E12 Gable (insulation at ceiling level)	9.6400	0.0600	0.5784	
E16 Corner (normal)	20.3600	0.0900	1.8324	
E17 Corner (inverted - internal area greater than external area)	0.0000	-0.0900	-0.0000	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	0.0000	0.5600	0.0000	
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.2400	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				10.0124 (36)
Point Thermal bridges				(36a) = 0.0000
Total fabric heat loss				(33) + (36) + (36a) = 59.3722 (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	45.5813	45.3285	45.0806	43.9165	43.6987	42.6848	42.6848	42.4971	43.0754	43.6987	44.1393	44.6000	(38)
Heat transfer coeff	104.9536	104.7007	104.4529	103.2888	103.0710	102.0571	102.0571	101.8693	102.4476	103.0710	103.5116	103.9722	(39)
Average = Sum(39)m / 12 =												103.2877	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1280	1.1253	1.1227	1.1102	1.1078	1.0969	1.0969	1.0949	1.1011	1.1078	1.1125	1.1175	(40)
HLP (average)												1.1101	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

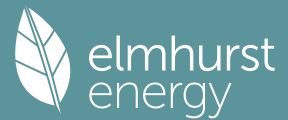
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6651 (42)
Hot water usage for mixer showers	68.9045	67.8690	66.3601	63.4730	61.3424	58.9664	57.6159	59.1134	60.7550	63.3061	66.2551	68.6405	(42a)
Hot water usage for baths	29.7544	29.3125	28.6902	27.5429	26.6837	25.7311	25.2165	25.8344	26.5072	27.5266	28.6976	29.6538	(42b)
Hot water usage for other uses	41.9232	40.3987	38.8742	37.3497	35.8252	34.3008	34.3008	35.8252	37.3497	38.8742	40.3987	41.9232	(42c)
Average daily hot water use (litres/day)													129.2266 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	140.5821	137.5802	133.9245	128.3656	123.8514	118.9983	117.1332	120.7731	124.6119	129.7069	135.3514	140.2175	(44)
Energy content (annual)	222.6476	195.9124	205.8370	175.7261	166.7278	146.3223	141.6624	149.5423	153.6590	176.0110	192.8329	219.5467	(45)
Distribution loss (46)m = 0.15 x (45)m	33.3971	29.3869	30.8755	26.3589	25.0092	21.9483	21.2494	22.4313	23.0488	26.4017	28.9249	32.9320	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6525 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8924 (55)
Total storage loss	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)
If cylinder contains dedicated solar storage	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(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	273.5737	241.9101	256.7631	225.0094	217.6539	195.6056	192.5885	200.4684	202.9423	226.9371	242.1162	270.4728	(62)
WWHRS	-31.5003	-27.8591	-29.1724	-24.1559	-22.5125	-19.2641	-18.0570	-19.2018	-19.9313	-23.4969	-26.6191	-30.9169	(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	242.0734	214.0510	227.5906	200.8535	195.1414	176.3415	174.5315	181.2666	183.0109	203.4402	215.4971	239.5558	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2453.3537	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
													0.0000 (64a)
Heat gains from water heating, kWh/month	114.7712	101.9391	109.1817	97.8556	96.1778	88.0788	87.8436	90.4637	90.5182	99.2645	103.5436	113.7401	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	133.1380	147.4027	133.1380	137.5759	133.1380	137.5759	133.1380	133.1380	137.5759	133.1380	137.5759	133.1380	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													

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Cooking gains	244.5607	247.0985	240.7034	227.0889	209.9032	193.7510	182.9603	180.4225	186.8176	200.4321	217.6178	233.7700 (68)
Pumps, fans	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254 (69)
Losses e.g. evaporation	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Water heating gains	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035 (71)
Total internal gains	154.2624	151.6950	146.7495	135.9105	129.2713	122.3317	118.0694	121.5910	125.7198	133.4201	143.8105	152.8765 (72)
	597.9373	612.1725	586.5672	566.5516	538.2887	516.6348	497.1439	498.1277	513.0896	532.9664	564.9806	585.7608 (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	
East				2.9900	19.6403	0.6300		0.7000		0.7700		17.9469 (76)	
West				9.6800	19.6403	0.6300		0.7000		0.7700		58.1025 (80)	
Solar gains	76.0494	148.7687	245.0009	357.3193	437.9082	448.2769	426.7779	366.5959	284.9462	176.5267	94.8247	62.5393 (83)	
Total gains	673.9867	760.9413	831.5681	923.8709	976.1969	964.9117	923.9218	864.7237	798.0358	709.4930	659.8052	648.3001 (84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	61.5616	61.7103	61.8567	62.5539	62.6860	63.3088	63.3088	63.4255	63.0675	62.6860	62.4192	62.1427
util living area	5.1041	5.1140	5.1238	5.1703	5.1791	5.2206	5.2206	5.2284	5.2045	5.1791	5.1613	5.1428
MIT	0.9953	0.9905	0.9786	0.9353	0.8304	0.6456	0.4802	0.5316	0.7840	0.9567	0.9902	0.9961 (86)
Th 2	19.7485	19.9214	20.1885	20.5524	20.8283	20.9649	20.9937	20.9896	20.9056	20.5435	20.0888	19.7240 (87)
util rest of house	19.9780	19.9802	19.9824	19.9925	19.9945	20.0034	20.0034	20.0050	19.9999	19.9945	19.9906	19.9866 (88)
MIT 2	0.9938	0.9875	0.9713	0.9134	0.7779	0.5579	0.3745	0.4219	0.7047	0.9375	0.9865	0.9949 (89)
Living area fraction	18.5297	18.7513	19.0900	19.5430	19.8522	19.9837	20.0014	20.0014	19.9372	19.5428	18.9732	18.5047 (90)
MIT	18.7537	18.9663	19.2919	19.7285	20.0316	20.1641	20.1838	20.1830	20.1152	19.7267	19.1783	18.7288 (92)
Temperature adjustment												0.0000
adjusted MIT	18.7537	18.9663	19.2919	19.7285	20.0316	20.1641	20.1838	20.1830	20.1152	19.7267	19.1783	18.7288 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9911	0.9832	0.9648	0.9065	0.7801	0.5727	0.3940	0.4420	0.7149	0.9309	0.9822	0.9926 (94)
Ext temp.	667.9851	748.1556	802.3155	837.4755	761.5191	552.6150	363.9928	382.2312	570.4816	660.4475	648.0702	643.4988 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Space heating kWh	1516.9701	1472.7543	1336.1538	1118.4645	858.7424	567.8522	365.7492	385.3743	616.2438	940.6966	1250.2410	1510.5924 (97)
Space heating requirement - total per year (kWh/year)	631.6448	486.9303	397.1757	202.3121	72.3341	0.0000	0.0000	0.0000	0.0000	208.5053	433.5630	645.1176 (98a)
Solar heating kWh												3077.5830
Solar heating contribution - total per year (kWh/year)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Space heating kWh	631.6448	486.9303	397.1757	202.3121	72.3341	0.0000	0.0000	0.0000	0.0000	208.5053	433.5630	645.1176 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3077.5830
Space heating per m ²										(98c) / (4) =		33.0781 (99)

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (201)
Fraction of space heat from main system(s)												1.0000 (202)
Efficiency of main space heating system 1 (in %)												92.3000 (206)
Efficiency of main space heating system 2 (in %)												0.0000 (207)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating efficiency (main heating system 1)	631.6448	486.9303	397.1757	202.3121	72.3341	0.0000	0.0000	0.0000	0.0000	208.5053	433.5630	645.1176 (98)
Space heating fuel (main heating system)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
Space heating efficiency (main heating system 2)	684.3389	527.5518	430.3095	219.1897	78.3685	0.0000	0.0000	0.0000	0.0000	225.8996	469.7324	698.9357 (211)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Water heating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating requirement	242.0734	214.0510	227.5906	200.8535	195.1414	176.3415	174.5315	181.2666	183.0109	203.4402	215.4971	239.5558 (64)
Efficiency of water heater (217)m	86.1093	85.8436	85.2957	84.0760	82.0489	79.8000	79.8000	79.8000	79.8000	84.1150	85.5949	79.8000 (216)
Fuel for water heating, kWh/month	281.1235	249.3499	266.8255	238.8950	237.8356	220.9793	218.7112	227.1511	229.3370	241.8596	251.7640	278.0088 (219)
Space cooling fuel requirement	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	27.6634	22.1926	19.9820	14.6397	11.3081	9.2388	10.3156	13.4087	17.4165	22.8514	25.8106	28.4323 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-42.8911	-60.1367	-85.9555	-96.0632	-103.0705	-95.9912	-94.7837	-89.7293	-80.7356	-68.4828	-47.0288	-37.1191 (233a)

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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	-25.2234	-52.9556	-105.0738	-157.5652	-208.1178	-209.0559	-206.6142	-175.0523	-128.4455	-75.6677	-33.6535	-19.9553	(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												3334.3261	(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												2941.8406	(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)												223.2598	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-2299.3676	(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												4286.0589	(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	3334.3261	0.2100	700.2085	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2941.8406	0.2100	617.7865	(264)
Space and water heating			1317.9950	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	223.2598	0.1443	32.2233	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-901.9874	0.1347	-121.5114	
PV Unit electricity exported	-1397.3801	0.1259	-175.9860	
Total			-297.4974	(269)
Total CO2, kg/year			1064.6501	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.4400	(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	3334.3261	1.1300	3767.7885	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2941.8406	1.1300	3324.2798	(278)
Space and water heating			7092.0683	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	223.2598	1.5338	342.4433	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-901.9874	1.4979	-1351.0797	
PV Unit electricity exported	-1397.3801	0.4623	-645.9921	
Total			-1997.0718	(283)
Total Primary energy kWh/year			5567.5406	(286)
Target Primary Energy Rate (TPER)			59.8400	(287)

Summary for Input Data

Plot Reference	AT05	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	85 B	DER	11.25	TER	9.63
Environmental	88 B	% DER < TER			-16.82
CO ₂ Emissions (t/year)	1.83	DFEE	44.76	TFEE	46.13
Compliance Check	See BREL	% DFEE < TFEE			2.97
% DPER < TPER	-26.87	DPER	64.46	TPER	50.81

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2026
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Enter TMP value
Thermal Mass	250.00

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements				
	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	50.04 m	98.98 m²	2.61 m
		44.77 m	88.67 m²	2.69 m

8.0 Living Area	18.01	m²
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Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		235.33	180.21	0.00	None	55.12	Enter Gross Area
WT05 Timber frame	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		14.07	14.07	0.00	None	0.00	Enter Gross Area

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	90.80	90.80	None	0.00	Enter Gross Area	0.00
RT03	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	10.18	8.57	None	0.00	Enter Gross Area	1.61

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	98.98
FT02 Exposed floor	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.13	None	0.00	20.00	2.00

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Solid door	Manufacturer	Solid Door				0.63			1.00
Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
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Summary for Input Data

D001	Solid door	WT01 Brick	North East	2.10
D002	DG Win	WT01 Brick	South West	5.22
W001	DG Win	WT01 Brick	East	1.15
W002	DG Win	WT01 Brick	North East	2.21
W003	DG Win	WT01 Brick	North	1.15
W004	DG Win	WT01 Brick	North East	1.32
W005	DG Win	WT01 Brick	South West	1.32
D003	DG Win	WT01 Brick	South West	2.65
D004	DG Win	WT01 Brick	South West	7.69
D005	Solid door	WT01 Brick	North East	1.96
W006	DG Win	WT01 Brick	North West	1.48
W008	DG Win	WT01 Brick	North West	0.82
W009	DG Win	WT01 Brick	North West	1.48
W007	DG Win	WT01 Brick	North West	2.17
W010	DG Win	WT01 Brick	South East	2.44
W011	DG Win	WT01 Brick	East	1.15
W012	DG Win	WT01 Brick	South East	2.21
W013	DG Win	WT01 Brick	South	1.15
W014	DG Win	WT01 Brick	North East	2.17
W015	DG Win	WT01 Brick	North East	1.48
W016	DG Win	WT01 Brick	South East	1.48
W017	DG Win	WT01 Brick	South West	2.17
W018	DG Win	WT01 Brick	South West	2.17
W019	DG Win	WT01 Brick	South West	2.17
W020	DG Win	WT01 Brick	North West	0.82
W021	DG Win	WT01 Brick	South East	0.82
W022	DG Win	WT01 Brick	South East	2.17
RL01	Roof light	RT03	South	1.61

0

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	Non Gov Approved Schemes	3.66	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	32.33	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	25.39	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	82.20	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	50.04	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	42.55	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	17.87	0.06	0.06 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	9.64	0.06	0.06 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	39.79	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	13.21	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	14.37	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	0.00	0.24	0.24 Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	5.84	0.32	0.32 Table R2	No

Y-value 0.06 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)

Summary for Input Data

Duct Installation Specification	Level 1				
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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

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 Fixed Lighting	No
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Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1

Manufacturer		
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	102	
In Winter	92.50	
In Summer	92.50	
Model Name		
Manufacturer		
Controls SAP Code	2110	
Controls description	Time and temperature zone control by arrangement	
Delayed Start Stat	No	
Burner Control	Modulating	
Flue Type	Balanced	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Unknown	
Boiler Interlock	No	

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No

Summary for Input Data

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 mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

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

Recommendations

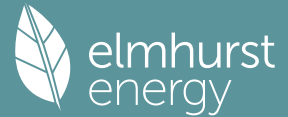
Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT05				Issued on Date	07/05/2026	
Assessment Reference	Be Lean			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	85 B	DER	11.25	TER	9.63		
Environmental	88 B	% DER < TER				-16.82	
CO ₂ Emissions (t/year)	1.83	DFEE	44.76	TFEE	46.13		
Compliance Check	See BREL	% DFEE < TFEE				2.97	
% DPER < TPER	-26.87	DPER	64.46	TPER	50.81		
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	98.9800 (1b)	x 2.6100 (2b)	= 258.3378 (1b) - (3b)
First floor	88.6700 (1c)	x 2.6900 (2c)	= 238.5223 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	187.6500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 496.8601 (5)

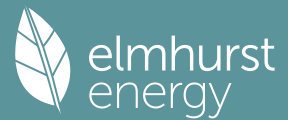
2. Ventilation rate

	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)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	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) =	79.2000 (23c)
Effective ac	0.2666 0.2634 0.2602 0.2442 0.2411 0.2251 0.2251 0.2219 0.2315 0.2411 0.2474 0.2538 (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							
DG Win			51.0600	1.1450	58.4656		(27)
Solid door			4.0600	1.0000	4.0600		(26)
Roof light			1.6100	1.1450	1.8435		(27a)
FT01			98.9800	0.1300	12.8674		(28a)
FT02 Exposed floor			2.0000	0.1300	0.2600		(28b)
WT01 Brick	235.3300	55.1200	180.2100	0.1800	32.4378		(29a)
WT05 Timber frame	14.0700		14.0700	0.1800	2.5326		(29a)
RT01	90.8000		90.8000	0.1100	9.9880		(30)
RT03	10.1800	1.6100	8.5700	0.1100	0.9427		(30)
Total net area of external elements Aum(A, m ²)			451.3600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	123.3977		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							

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K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	3.6600	0.0500	0.1830
E2 Other lintels (including other steel lintels)	32.3300	0.0500	1.6165
E3 Sill	25.3900	0.0500	1.2695
E4 Jamb	82.2000	0.0500	4.1100
E5 Ground floor (normal)	50.0400	0.1600	8.0064
E6 Intermediate floor within a dwelling	42.5500	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	17.8700	0.0600	1.0722
E12 Gable (insulation at ceiling level)	9.6400	0.0600	0.5784
E16 Corner (normal)	39.7900	0.0900	3.5811
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	14.3700	0.5600	8.0472
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.2400	0.0000
E20 Exposed floor (normal)	5.8400	0.3200	1.8688
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			29.1442 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	152.5419 (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	43.7066	43.1840	42.6613	40.0482	39.5255	36.9124	36.9124	36.3897	37.9576	39.5255	40.5708	41.6161	(38)
Heat transfer coeff	196.2485	195.7258	195.2032	192.5900	192.0674	189.4542	189.4542	188.9316	190.4995	192.0674	193.1127	194.1579	(39)
Average = Sum(39)m / 12 =												192.4594	
HLP	1.0458	1.0430	1.0403	1.0263	1.0235	1.0096	1.0096	1.0068	1.0152	1.0235	1.0291	1.0347	(40)
HLP (average)												1.0256	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

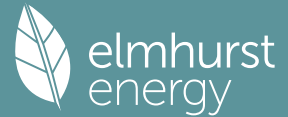
Assumed occupancy													2.9858 (42)
Hot water usage for mixer showers													
74.2824	73.1661	71.5394	68.4270	66.1301	63.5687	62.1127	63.7271	65.4968	68.2470	71.4262	73.9978	73.9978	(42a)
Hot water usage for baths													
32.0671	31.5908	30.9202	29.6836	28.7577	27.7310	27.1765	27.8424	28.5675	29.6661	30.9281	31.9587	31.9587	(42b)
Hot water usage for other uses													
45.2079	43.5639	41.9200	40.2761	38.6322	36.9883	36.9883	38.6322	40.2761	41.9200	43.5639	45.2079	45.2079	(42c)
Average daily hot water use (litres/day)												139.3152	(43)
Daily hot water use													
151.5573	148.3208	144.3796	138.3867	133.5200	128.2879	126.2774	130.2017	134.3404	139.8331	145.9183	151.1643	151.1643	(44)
Energy conte	240.0298	211.2069	221.9060	189.4445	179.7436	157.7450	152.7216	161.2169	165.6552	189.7522	207.8874	236.6868	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m													
36.0045	31.6810	33.2859	28.4167	26.9615	23.6617	22.9082	24.1825	24.8483	28.4628	31.1831	35.5030	35.5030	(46)
Water storage loss (or HIU loss):													
Store volume												200.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.9288	(55)
Total storage loss													
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(56)
If cylinder contains dedicated solar storage													
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980	(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													
306.1205	270.9018	287.9968	253.4033	245.8343	221.7038	218.8124	227.3077	229.6140	255.8430	271.8462	302.7775	302.7775	(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													
306.1205	270.9018	287.9968	253.4033	245.8343	221.7038	218.8124	227.3077	229.6140	255.8430	271.8462	302.7775	302.7775	(64)
12Total per year (kWh/year)												3092.1613	(64)
Electric shower(s)												3092	(64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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													
132.6825	117.9822	126.6564	114.1573	112.6374	103.6173	103.6526	106.4772	106.2474	115.9652	120.2896	131.5710	131.5710	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
181.1506	200.5596	181.1506	187.1890	181.1506	187.1890	181.1506	181.1506	187.1890	181.1506	187.1890	181.1506	181.1506	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
359.1514	362.8783	353.4867	333.4931	308.2548	284.5344	268.6876	264.9608	274.3524	294.3459	319.5842	343.3047	343.3047	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	(71)
Water heating gains (Table 5)													
178.3367	175.5687	170.2370	158.5518	151.3943	143.9128	139.3179	143.1146	147.5658	155.8672	167.0689	176.8427	176.8427	(72)
Total internal gains													
789.4261	809.7940	775.6618	750.0213	711.5871	683.4236	656.9436	657.0134	676.8946	702.1512	744.6295	772.0854	772.0854	(73)

6. Solar gains

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[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	g FF Specific data or Table 6c	Access factor Table 6d	Gains W
North	1.1500	10.6334	0.6300	0.7000	0.7700	3.7372 (74)
Northeast	7.1800	11.2829	0.6300	0.7000	0.7700	24.7582 (75)
East	2.3000	19.6403	0.6300	0.7000	0.7700	13.8053 (76)
Southeast	9.1200	36.7938	0.6300	0.7000	0.7700	102.5514 (77)
South	1.1500	46.7521	0.6300	0.7000	0.7700	16.4312 (78)
Southwest	23.3900	36.7938	0.6300	0.7000	0.7700	263.0129 (79)
Northwest	6.7700	11.2829	0.6300	0.7000	0.7700	23.3444 (81)
South	1.6100	26.0000	0.6300	0.7000	1.0000	16.6142 (82)

Solar gains	464.2549	816.1702	1180.6384	1564.3290	1840.6789	1865.1991	1782.5883	1571.3610	1313.0994	919.6118	560.7751	394.2155 (83)
Total gains	1253.6810	1625.9643	1956.3002	2314.3504	2552.2660	2548.6227	2439.5319	2228.3744	1989.9939	1621.7630	1305.4047	1166.3009 (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	66.4018	66.5791	66.7574	67.6632	67.8473	68.7831	68.7831	68.9734	68.4057	67.8473	67.4800	67.1168
alpha	5.4268	5.4386	5.4505	5.5109	5.5232	5.5855	5.5855	5.5982	5.5604	5.5232	5.4987	5.4745
util living area	0.9966	0.9866	0.9546	0.8493	0.6674	0.4718	0.3411	0.3888	0.6366	0.9199	0.9902	0.9977 (86)
MIT	20.0572	20.2670	20.5221	20.7839	20.9076	20.9400	20.9439	20.9434	20.9233	20.7221	20.3339	20.0251 (87)
Th 2	20.0453	20.0476	20.0499	20.0615	20.0638	20.0753	20.0753	20.0776	20.0707	20.0638	20.0591	20.0545 (88)
util rest of house	0.9955	0.9824	0.9413	0.8135	0.6104	0.4054	0.2698	0.3115	0.5604	0.8906	0.9864	0.9969 (89)
MIT 2	18.9398	19.2078	19.5262	19.8392	19.9644	20.0018	20.0039	20.0061	19.9866	19.7816	19.3038	18.9061 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.0470	19.3094	19.6217	19.9298	20.0549	20.0918	20.0941	20.0961	20.0765	19.8719	19.4027	19.0135 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.0470	19.3094	19.6217	19.9298	20.0549	20.0918	20.0941	20.0961	20.0765	19.8719	19.4027	19.0135 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9939	0.9782	0.9340	0.8079	0.6098	0.4066	0.2712	0.3130	0.5609	0.8834	0.9829	0.9957 (94)
Useful gains	1246.0610	1590.4973	1827.2336	1869.8451	1556.4502	1036.3060	661.6420	697.5863	1116.1008	1432.6356	1283.0987	1161.3325 (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	2894.0823	2820.2957	2561.4058	2124.2338	1604.7081	1040.4489	661.9727	698.3104	1138.5126	1780.8258	2375.8066	2876.1617 (97)
Space heating kWh	1226.1279	826.4245	546.2241	183.1599	35.9039	0.0000	0.0000	0.0000	0.0000	259.0535	786.7497	1275.8330 (98a)
Space heating requirement - total per year (kWh/year)	5139.4765											
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	1226.1279	826.4245	546.2241	183.1599	35.9039	0.0000	0.0000	0.0000	0.0000	259.0535	786.7497	1275.8330 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	5139.4765											
Space heating per m2	(98c) / (4) = 27.3886 (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 %)												87.5000 (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	1226.1279	826.4245	546.2241	183.1599	35.9039	0.0000	0.0000	0.0000	0.0000	259.0535	786.7497	1275.8330 (98)
Space heating efficiency (main heating system 1)	87.5000	87.5000	87.5000	87.5000	87.5000	0.0000	0.0000	0.0000	0.0000	87.5000	87.5000	87.5000 (210)
Space heating fuel (main heating system)	1401.2890	944.4852	624.2562	209.3256	41.0331	0.0000	0.0000	0.0000	0.0000	296.0612	899.1425	1458.0948 (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	306.1205	270.9018	287.9968	253.4033	245.8343	221.7038	218.8124	227.3077	229.6140	255.8430	271.8462	302.7775 (64)
Efficiency of water heater (217)m	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000 (216)
Fuel for water heating, kWh/month	349.8520	309.6020	329.1392	289.6038	280.9535	253.3758	250.0713	259.7802	262.4159	292.3920	310.6814	346.0315 (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	54.6562	49.3669	54.6562	52.8931	54.6562	52.8931	54.6562	54.6562	52.8931	54.6562	52.8931	54.6562 (231)
Lighting	39.7588	31.8960	28.7188	21.0406	16.2524	13.2783	14.8260	19.2714	25.0316	32.8428	37.0959	40.8638 (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)												

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(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												5873.6875	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												92.5000	
Water heating fuel used												3533.8986	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)													
mechanical ventilation fans (SFP = 0.9940)												602.5323	(230a)
central heating pump												41.0000	(230c)
Total electricity for the above, kWh/year												643.5323	(231)
Electricity for lighting (calculated in Appendix L)												320.8764	(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												10371.9948	(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	5873.6875	0.2100	1233.4744	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3533.8986	0.2100	742.1187	(264)
Space and water heating			1975.5931	(265)
Pumps, fans and electric keep-hot	643.5323	0.1387	89.2659	(267)
Energy for lighting	320.8764	0.1443	46.3124	(268)
Total CO2, kg/year			2111.1713	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			11.2500	(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	5873.6875	1.1300	6637.2668	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3533.8986	1.1300	3993.3054	(278)
Space and water heating			10630.5723	(279)
Pumps, fans and electric keep-hot	643.5323	1.5128	973.5357	(281)
Energy for lighting	320.8764	1.5338	492.1710	(282)
Total Primary energy kWh/year			12096.2789	(286)
Dwelling Primary energy Rate (DPER)			64.4600	(287)

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

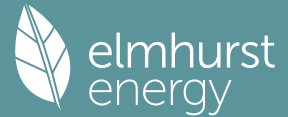
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	98.9800 (1b)	x 2.6100 (2b)	= 258.3378 (1b) - (3b)	
First floor	88.6700 (1c)	x 2.6900 (2c)	= 238.5223 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	187.6500			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 496.8601	(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	4 * 10 =	40.0000 (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) =	40.0000 / (5) =	0.0805 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3305	(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) =	0.2809 (21)

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Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.3582	0.3512	0.3441	0.3090	0.3020	0.2669	0.2669	0.2599	0.2809	0.3020	0.3160	0.3301 (22b)
Effective ac	0.5641	0.5617	0.5592	0.5477	0.5456	0.5356	0.5356	0.5338	0.5395	0.5456	0.5499	0.5545 (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			4.0600	1.0000	4.0600		(26)
TER Opening Type			41.5900	1.1450	47.6221		(27)
TER Roof Window			1.3100	1.1450	2.0852		(27a)
FT01			98.9800	0.1300	12.8674		(28a)
FT02 Exposed floor			2.0000	0.1300	0.2600		(28b)
WT01 Brick	235.3300	45.6500	189.6800	0.1800	34.1424		(29a)
WT05 Timber frame	14.0700		14.0700	0.1800	2.5326		(29a)
RT01	90.8000		90.8000	0.1100	9.9880		(30)
RT03	10.1800	1.3100	8.8700	0.1100	0.9757		(30)
Total net area of external elements Aum(A, m2)			451.3600				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	114.5334	(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	3.6600	0.0500	0.1830
E2 Other lintels (including other steel lintels)	32.3300	0.0500	1.6165
E3 Sill	25.3900	0.0500	1.2695
E4 Jamb	82.2000	0.0500	4.1100
E5 Ground floor (normal)	50.0400	0.1600	8.0064
E6 Intermediate floor within a dwelling	42.5500	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	17.8700	0.0600	1.0722
E12 Gable (insulation at ceiling level)	9.6400	0.0600	0.5784
E16 Corner (normal)	39.7900	0.0900	3.5811
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	14.3700	0.5600	8.0472
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.2400	0.0000
E20 Exposed floor (normal)	5.8400	0.3200	1.8688

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

29.1442 (36)

Point Thermal Bridges

Total fabric heat loss (33) + (36) + (36a) = 143.6776 (37)

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

(38)m	Jan 92.4999	Feb 92.0915	Mar 91.6912	Apr 89.8108	May 89.4590	Jun 87.8212	Jul 87.8212	Aug 87.5179	Sep 88.4521	Oct 89.4590	Nov 90.1707	Dec 90.9147 (38)
Heat transfer coeff	236.1776	235.7691	235.3688	233.4884	233.1366	231.4989	231.4989	231.1956	232.1297	233.1366	233.8483	234.5924 (39)
Average = Sum(39)m / 12 =												233.4867

HLP	Jan 1.2586	Feb 1.2564	Mar 1.2543	Apr 1.2443	May 1.2424	Jun 1.2337	Jul 1.2337	Aug 1.2321	Sep 1.2370	Oct 1.2424	Nov 1.2462	Dec 1.2502 (40)
HLP (average)												1.2443
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9858 (42)
Hot water usage for mixer showers												
74.2824	73.1661	71.5394	68.4270	66.1301	63.5687	62.1127	63.7271	65.4968	68.2470	71.4262	73.9978	(42a)
Hot water usage for baths												
32.0671	31.5908	30.9202	29.6836	28.7577	27.7310	27.1765	27.8424	28.5675	29.6661	30.9281	31.9587	(42b)
Hot water usage for other uses												
45.2079	43.5639	41.9200	40.2761	38.6322	36.9883	36.9883	38.6322	40.2761	41.9200	43.5639	45.2079	(42c)
Average daily hot water use (litres/day)												139.3152 (43)

Daily hot water use	Jan 151.5573	Feb 148.3208	Mar 144.3796	Apr 138.3867	May 133.5200	Jun 128.2879	Jul 126.2774	Aug 130.2017	Sep 134.3404	Oct 139.8331	Nov 145.9183	Dec 151.1643 (44)
Energy conte	240.0298	211.2069	221.9060	189.4445	179.7436	157.7450	152.7216	161.2169	165.6552	189.7522	207.8874	236.6868 (45)
Energy content (annual)										Total = Sum(45)m =		2313.9959
Distribution loss (46)m = 0.15 x (45)m	36.0045	31.6810	33.2859	28.4167	26.9615	23.6617	22.9082	24.1825	24.8483	28.4628	31.1831	35.5030 (46)

Water storage loss (or HIU loss):

Store volume 200.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day):

Temperature factor from Table 2b

Enter (49) or (54) in (55) 1.6525 (48)

Total storage loss 0.5400 (49)

27.6637 24.9865 27.6637 26.7713 27.6637 26.7713 27.6637 27.6637 26.7713 27.6637 26.7713 27.6637 27.6637 (56)

If cylinder contains dedicated solar storage 27.6637 24.9865 27.6637 26.7713 27.6637 26.7713 27.6637 27.6637 26.7713 27.6637 26.7713 27.6637 27.6637 (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 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 0.0000 (61)

Total heat required for water heating calculated for each month 290.9558 257.2046 272.8321 238.7278 230.6697 207.0283 203.6477 212.1430 214.9385 240.6783 257.1707 287.6129 (62)

WWHRS -33.9588 -30.0334 -31.4493 -26.0413 -24.2695 -20.7676 -19.4663 -20.7005 -21.4870 -25.3308 -28.6967 -33.3299 (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 -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 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 0.0000 (63d)

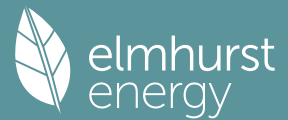
Output from w/h 256.9970 227.1712 241.3828 212.6865 206.4001 186.2607 184.1814 191.4425 193.4515 215.3476 228.4740 254.2829 (64)

12Total per year (kWh/year) Total per year (kWh/year) = Sum(64)m = 2598.0783 (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 0.0000 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

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Heat gains from water heating, kWh/month
120.5508 107.0245 114.5246 102.4169 100.5056 91.8768 91.5208 94.3455 94.5070 103.8335 108.5492 119.4392 (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	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	181.1506	200.5596	181.1506	187.1890	181.1506	187.1890	181.1506	181.1506	187.1890	181.1506	187.1890	181.1506 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	359.1514	362.8783	353.4867	333.4931	308.2548	284.5344	268.6876	264.9608	274.3524	294.3459	319.5842	343.3047 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331 (71)
Water heating gains (Table 5)	162.0306	159.2626	153.9309	142.2457	135.0882	127.6067	123.0118	126.8084	131.2597	139.5611	150.7628	160.5366 (72)
Total internal gains	773.1200	793.4879	759.3556	733.7152	695.2810	667.1175	640.6375	640.7073	660.5885	685.8451	728.3234	755.7793 (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
North	0.9400	10.6334	0.6300	0.7000	0.7700	3.0547 (74)
Northeast	5.8400	11.2829	0.6300	0.7000	0.7700	20.1376 (75)
East	1.8800	19.6403	0.6300	0.7000	0.7700	11.2844 (76)
Southeast	7.4300	36.7938	0.6300	0.7000	0.7700	83.5479 (77)
South	0.9400	46.7521	0.6300	0.7000	0.7700	13.4308 (78)
Southwest	19.0500	36.7938	0.6300	0.7000	0.7700	214.2110 (79)
Northwest	5.5100	11.2829	0.6300	0.7000	0.7700	18.9997 (81)
South	1.3100	26.0000	0.6300	0.7000	1.0000	13.5184 (82)

Solar gains 378.1844 664.8438 961.7021 1274.1866 1499.2323 1519.1833 1451.9062 1279.8958 1069.5813 749.0972 456.8080 321.1315 (83)
Total gains 1151.3044 1458.3317 1721.0578 2007.9018 2194.5133 2186.3008 2092.5437 1920.6030 1730.1698 1434.9423 1185.1315 1076.9108 (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 from living area, nil,m (see Table 9a)												
tau	55.1756	55.2712	55.3652	55.8111	55.8953	56.2908	56.2908	56.3646	56.1378	55.8953	55.7252	55.5485
alpha	4.6784	4.6847	4.6910	4.7207	4.7264	4.7527	4.7527	4.7576	4.7425	4.7264	4.7150	4.7032
util living area	0.9978	0.9930	0.9796	0.9328	0.8203	0.6392	0.4785	0.5384	0.7925	0.9640	0.9945	0.9984 (86)
MIT	19.4341	19.6843	20.0319	20.4652	20.7933	20.9527	20.9902	20.9834	20.8704	20.4150	19.8368	19.3921 (87)
Th 2	19.8734	19.8751	19.8768	19.8847	19.8862	19.8932	19.8932	19.8944	19.8905	19.8862	19.8832	19.8801 (88)
util rest of house	0.9970	0.9906	0.9724	0.9093	0.7633	0.5442	0.3624	0.4167	0.7085	0.9467	0.9923	0.9978 (89)
MIT 2	18.0546	18.3751	18.8159	19.3521	19.7179	19.8674	19.8903	19.8889	19.8051	19.3048	18.5769	18.0055 (90)
Living area fraction												0.0960 (91)
MIT	18.1870	18.5007	18.9326	19.4589	19.8211	19.9716	19.9958	19.9940	19.9073	19.4113	18.6978	18.1386 (92)
Temperature adjustment												0.0000
adjusted MIT	18.1870	18.5007	18.9326	19.4589	19.8211	19.9716	19.9958	19.9940	19.9073	19.4113	18.6978	18.1386 (93)

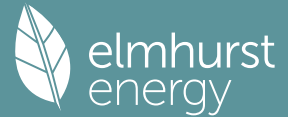
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9951	0.9862	0.9641	0.8981	0.7595	0.5513	0.3734	0.4280	0.7099	0.9366	0.9885	0.9964 (94)
Useful gains	1145.7134	1438.2736	1659.2695	1803.2708	1666.6642	1205.3282	781.4364	822.0821	1228.3309	1343.9103	1171.5517	1073.0129 (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	3279.8027	3206.6321	2926.2375	2465.3893	1893.3237	1243.5138	786.1321	830.9065	1348.0562	2054.2464	2712.1209	3269.8956 (97)
Space heating kWh	1587.7625	1188.3369	942.6242	476.7254	168.6347	0.0000	0.0000	0.0000	0.0000	528.4901	1109.2098	1634.4808 (98a)
Space heating requirement - total per year (kWh/year)												7636.2643
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	1587.7625	1188.3369	942.6242	476.7254	168.6347	0.0000	0.0000	0.0000	0.0000	528.4901	1109.2098	1634.4808 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												7636.2643
Space heating per m2										(98c) / (4) =		40.6942 (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	1587.7625	1188.3369	942.6242	476.7254	168.6347	0.0000	0.0000	0.0000	0.0000	528.4901	1109.2098	1634.4808 (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)	1720.2194	1287.4723	1021.2613	516.4955	182.7028	0.0000	0.0000	0.0000	0.0000	572.5786	1201.7441	1770.8351 (211)

Full SAP Calculation Printout



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	256.9970	227.1712	241.3828	212.6865	206.4001	186.2607	184.1814	191.4425	193.4515	215.3476	228.4740	254.2829	(64)
Efficiency of water heater	87.4264	87.2213	86.8041	85.8142	83.6104	79.8000	79.8000	79.8000	79.8000	85.9922	87.1218	87.4718	(216)
Fuel for water heating, kWh/month	293.9583	260.4538	278.0776	247.8454	246.8596	233.4094	230.8037	239.9029	242.4204	250.4268	262.2468	290.7026	(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	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	37.6395	30.1958	27.1880	19.9191	15.3861	12.5706	14.0357	18.2441	23.6973	31.0922	35.1185	38.6856	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-82.1521	-110.8724	-152.5819	-163.9114	-170.4061	-156.6291	-154.4285	-148.6402	-137.8550	-122.7616	-88.4213	-71.5960	(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	-62.7741	-129.7525	-253.8686	-375.7306	-491.7052	-492.4157	-486.8519	-414.7322	-307.2169	-183.9454	-83.2453	-49.8406	(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												8273.3091	(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												3077.1071	(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)												303.7725	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-4892.3345	(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												6847.8542	(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	8273.3091	0.2100	1737.3949 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3077.1071	0.2100	646.1925 (264)
Space and water heating			2383.5874 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	303.7725	0.1443	43.8438 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1560.2555	0.1356	-211.5287
PV Unit electricity exported	-3332.0790	0.1263	-420.9224
Total			-632.4511 (269)
Total CO2, kg/year			1806.9093 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.6300 (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	8273.3091	1.1300	9348.8393 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3077.1071	1.1300	3477.1311 (278)
Space and water heating			12825.9703 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	303.7725	1.5338	465.9364 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1560.2555	1.5011	-2342.1149
PV Unit electricity exported	-3332.0790	0.4637	-1545.1356
Total			-3887.2506 (283)
Total Primary energy kWh/year			9534.7570 (286)
Target Primary Energy Rate (TPER)			50.8100 (287)

Summary for Input Data

Plot Reference	AT06	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	85 B	DER	11.86	TER	10.84
Environmental	88 B	% DER < TER			-9.41
CO ₂ Emissions (t/year)	1.52	DFEE	43.17	TFEE	44.80
Compliance Check	See BREL	% DFEE < TFEE			3.63
% DPER < TPER	-19.39	DPER	67.74	TPER	56.74

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	3	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	36.28 m	61.78 m²	2.61 m
	2nd Storey:	29.54 m	52.04 m²	2.69 m
		11.94 m	32.20 m²	2.16 m

8.0 Living Area	19.91	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		94.69	69.06	0.00	None	25.63	Enter Gross Area
	WT02 Tile hung	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		93.49	86.06	0.00	None	7.43	Enter Gross Area
	WT03 Dormer	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		7.98	6.50	0.00	None	1.48	Enter Gross Area

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	RT01 Ceiling	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	4.05	4.05	None	0.00	Enter Gross Area	0.00
	RT03 Flat	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	8.31	7.23	None	0.00	Enter Gross Area	1.08
	RT02 Rafter	External Slope Roof	Plasterboard, insulated slope	0.11	9.00	73.02	72.34	None	0.00	Enter Gross Area	0.68

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	61.78

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

Summary for Input Data

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	North East	2.10	
D002	DG Win	WT01 Brick	South West	2.65	
W001	DG Win	WT01 Brick	North East	2.72	
W002	DG Win	WT01 Brick	North East	2.72	
W003	DG Win	WT01 Brick	South	1.15	
W004	DG Win	WT01 Brick	South East	2.79	
W005	DG Win	WT01 Brick	East	1.15	
D003	DG Win	WT01 Brick	South West	5.22	
W006	DG Win	WT01 Brick	South East	1.48	
W008	DG Win	WT02 Tile hung	North East	1.48	
W009	DG Win	WT02 Tile hung	North East	1.48	
W007	DG Win	WT02 Tile hung	North East	0.82	
W010	DG Win	WT02 Tile hung	South East	2.17	
W011	DG Win	WT02 Tile hung	South West	1.48	
W012	DG Win	WT01 Brick	South West	2.17	
W013	DG Win	WT03 Dormer	North East	1.48	
W014	DG Win	WT01 Brick	North East	1.48	
RL01	Roof light	RT02 Rafter	South West	0.68	0
RL02	Roof light	RT03 Flat	South West	1.08	0

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	23.32	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	18.57	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	49.95	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	36.28	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	31.99	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	3.33	0.06	0.06 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	23.81	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	2.61	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	14.37	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	9.56	0.24	0.24 Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	0.00	0.32	0.32 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	17.92	0.04	0.04 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	11.02	0.08	0.08 Table R2	No
R1 Head of roof window	Non Gov Approved Schemes	0.75	0.08	0.08 Table R2	No
R2 Sill of roof window	Non Gov Approved Schemes	0.75	0.06	0.06 Table R2	No
R3 Jamb of roof window	Non Gov Approved Schemes	1.80	0.08	0.08 Table R2	No
R4 Ridge (vaulted ceiling)	Non Gov Approved Schemes	8.96	0.08	0.08 Table R2	No
R7 Flat ceiling (inverted)	Non Gov Approved Schemes	2.96	0.04	0.04 Table R2	No
R9 Roof to wall (flat ceiling)	Non Gov Approved Schemes	6.52	0.04	0.04 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)

Summary for Input Data

Duct Installation Specification	Level 1				
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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

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 Fixed Lighting	No
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Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1

Manufacturer		
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	102	
In Winter	92.50	
In Summer	92.50	
Model Name		
Manufacturer		
Controls SAP Code	2110	
Controls description	Time and temperature zone control by arrangement	
Delayed Start Stat	No	
Burner Control	Modulating	
Flue Type	Balanced	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Unknown	
Boiler Interlock	No	

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No

Summary for Input Data

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 mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

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

Recommendations

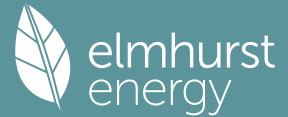
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT06				Issued on Date	07/05/2026	
Assessment Reference	Be Lean			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	85 B		DER	11.86		TER	10.84
Environmental	88 B		% DER < TER				-9.41
CO ₂ Emissions (t/year)	1.52		DFEE	43.17		TFEE	44.80
Compliance Check	See BREL		% DFEE < TFEE				3.63
% DPER < TPER	-19.39		DPER	67.74		TPER	56.74
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	61.7800 (1b)	x 2.6100 (2b)	= 161.2458 (1b) - (3b)
First floor	52.0400 (1c)	x 2.6900 (2c)	= 139.9876 (1c) - (3c)
Second floor	32.2000 (1d)	x 2.1600 (2d)	= 69.5520 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	146.0200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 370.7854 (5)

2. Ventilation rate

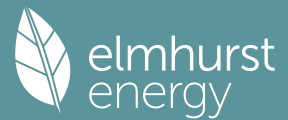
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			32.4400	1.1450	37.1450		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof light			1.7600	1.1450	2.0153		(27a)
FT01			61.7800	0.1300	8.0314		(28a)
WT01 Brick	94.6900	25.6300	69.0600	0.1800	12.4308		(29a)
WT02 Tile hung	93.4900	7.4300	86.0600	0.1800	15.4908		(29a)
WT03 Dormer	7.9800	1.4800	6.5000	0.1800	1.1700		(29a)
RT01 Ceiling	4.0500		4.0500	0.1100	0.4455		(30)
RT03 Flat	8.3100	1.0800	7.2300	0.1100	0.7953		(30)
RT02 Rafter	73.0200	0.6800	72.3400	0.1100	7.9574		(30)
Total net area of external elements Aum(A, m ²)			343.3200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	87.5815		(33)

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

250.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element	0.0000	0.0500	0.0000
E1 Steel lintel with perforated steel base plate	23.3200	0.0500	1.1660
E2 Other lintels (including other steel lintels)	18.5700	0.0500	0.9285
E3 Sill	49.9500	0.0500	2.4975
E4 Jamb	36.2800	0.1600	5.8048
E5 Ground floor (normal)	31.9900	0.0000	0.0000
E6 Intermediate floor within a dwelling	3.3300	0.0600	0.1998
E10 Eaves (insulation at ceiling level)	0.0000	0.0600	0.0000
E12 Gable (insulation at ceiling level)	23.8100	0.0900	2.1429
E16 Corner (normal)	2.6100	-0.0900	-0.2349
E17 Corner (inverted - internal area greater than external area)	0.0000	0.0600	0.0000
E18 Party wall between dwellings	0.0000	0.0800	0.0000
P1 Party wall - Ground floor	0.0000	0.0000	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.1200	0.0000
P4 Party wall - Roof (insulation at ceiling level)	14.3700	0.5600	8.0472
E15 Flat roof with parapet	9.5600	0.2400	2.2944
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.3200	0.0000
E20 Exposed floor (normal)	17.9200	0.0400	0.7168
E11 Eaves (insulation at rafter level)	11.0200	0.0800	0.8816
E13 Gable (insulation at rafter level)	0.7500	0.0800	0.0600
R1 Head of roof window	0.7500	0.0600	0.0450
R2 Sill of roof window	1.8000	0.0800	0.1440
R3 Jamb of roof window	8.9600	0.0800	0.7168
R4 Ridge (vaulted ceiling)	2.9600	0.0400	0.1184
R7 Flat ceiling (inverted)	6.5200	0.0400	0.2608
R9 Roof to wall (flat ceiling)			
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			25.7896 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 113.3711 (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	32.6164	32.2263	31.8363	29.8862	29.4962	27.5461	27.5461	27.1561	28.3262	29.4962	30.2763	31.0563 (38)
Heat transfer coeff	145.9875	145.5975	145.2074	143.2573	142.8673	140.9172	140.9172	140.5272	141.6973	142.8673	143.6474	144.4274 (39)
Average = Sum(39)m / 12 =												143.1598
HLP	0.9998	0.9971	0.9944	0.9811	0.9784	0.9651	0.9651	0.9624	0.9704	0.9784	0.9838	0.9891 (40)
HLP (average)												0.9804
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

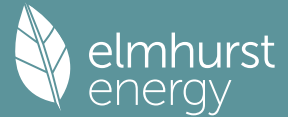
4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9278 (42)
Hot water usage for mixer showers	73.3090	72.2073	70.6020	67.5304	65.2636	62.7357	61.2989	62.8921	64.6386	67.3527	70.4903	73.0282 (42a)
Hot water usage for baths	31.6485	31.1785	30.5166	29.2962	28.3823	27.3691	26.8217	27.4790	28.1946	29.2789	30.5244	31.5415 (42b)
Hot water usage for other uses	44.6134	42.9911	41.3688	39.7465	38.1241	36.5018	36.5018	38.1241	39.7465	41.3688	42.9911	44.6134 (42c)
Average daily hot water use (litres/day)												137.4892 (43)
Daily hot water use	149.5709	146.3769	142.4873	136.5730	131.7701	126.6066	124.6224	128.4952	132.5796	138.0004	144.0058	149.1830 (44)
Energy conte	236.8838	208.4387	218.9977	186.9616	177.3879	155.6776	150.7200	159.1039	163.4840	187.2652	205.1627	233.5846 (45)
Energy content (annual)										Total = Sum(45)m =		2283.6676
Distribution loss (46)m = 0.15 x (45)m	35.5326	31.2658	32.8497	28.0442	26.6082	23.3516	22.6080	23.8656	24.5226	28.0898	30.7744	35.0377 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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	302.9745	268.1336	285.0884	250.9204	243.4786	219.6364	216.8108	225.1947	227.4428	253.3560	269.1215	299.6753 (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)
FV 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	302.9745	268.1336	285.0884	250.9204	243.4786	219.6364	216.8108	225.1947	227.4428	253.3560	269.1215	299.6753 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		3061.8330 (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	131.6365	117.0618	125.6893	113.3318	111.8541	102.9298	102.9870	105.7747	105.5255	115.1383	119.3836	130.5395 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	159.4659	176.5515	159.4659	164.7814	159.4659	164.7814	159.4659	159.4659	164.7814	159.4659	164.7814	159.4659 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	316.1589	319.4397	311.1723	293.5721	271.3550	250.4740	236.5242	233.2435	241.5108	259.1111	281.3282	302.2092 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111 (71)
Water heating gains (Table 5)												

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Total internal gains	176.9307	174.1991	168.9373	157.4052	150.3415	142.9581	138.4234	142.1702	146.5631	154.7558	165.8106	175.4563 (72)
	722.4722	740.1069	709.4921	685.6754	651.0790	625.1302	601.3302	601.7963	619.7720	643.2494	681.8369	707.0480 (73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c				Access factor Table 6d	Gains W
Northeast					12.1800	11.2829	0.6300	0.7000				0.7700	41.9992 (75)
East					1.1500	19.6403	0.6300	0.7000				0.7700	6.9027 (76)
Southeast					6.4400	36.7938	0.6300	0.7000				0.7700	72.4157 (77)
South					1.1500	46.7521	0.6300	0.7000				0.7700	16.4312 (78)
Southwest					11.5200	36.7938	0.6300	0.7000				0.7700	129.5386 (79)
Southwest					1.7600	26.0000	0.6300	0.7000				1.0000	18.1621 (82)
Solar gains	285.4496	507.6282	748.2835	1012.1080	1207.4899	1230.2536	1173.0614	1023.1349	839.3351	575.8245	345.8761	241.6735	(83)
Total gains	1007.9218	1247.7351	1457.7756	1697.7834	1858.5689	1855.3838	1774.3915	1624.9311	1459.1071	1219.0738	1027.7129	948.7215	(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	69.4599	69.6460	69.8330	70.7837	70.9769	71.9591	71.9591	72.1588	71.5630	70.9769	70.5915	70.2102
alpha	5.6307	5.6431	5.6555	5.7189	5.7318	5.7973	5.7973	5.8106	5.7709	5.7318	5.7061	5.6807
util living area	0.9959	0.9865	0.9579	0.8599	0.6816	0.4822	0.3489	0.3967	0.6466	0.9215	0.9889	0.9971 (86)
MIT	20.1330	20.3145	20.5433	20.7903	20.9108	20.9424	20.9460	20.9455	20.9267	20.7399	20.3890	20.1056 (87)
Th 2	20.0835	20.0857	20.0880	20.0991	20.1014	20.1126	20.1126	20.1148	20.1081	20.1014	20.0969	20.0924 (88)
util rest of house	0.9946	0.9823	0.9456	0.8260	0.6261	0.4171	0.2788	0.3210	0.5723	0.8931	0.9848	0.9961 (89)
MIT 2	19.0673	19.2991	19.5852	19.8823	20.0052	20.0417	20.0437	20.0459	20.0272	19.8360	19.4043	19.0396 (90)
Living area fraction	19.2126	19.4376	19.7159	20.0061	20.1287	20.1645	20.1667	20.1686	20.1499	19.9592	19.5386	19.1849 (92)
MIT	19.2126	19.4376	19.7159	20.0061	20.1287	20.1645	20.1667	20.1686	20.1499	19.9592	19.5386	19.1849 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2126	19.4376	19.7159	20.0061	20.1287	20.1645	20.1667	20.1686	20.1499	19.9592	19.5386	19.1849 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9929	0.9786	0.9395	0.8222	0.6279	0.4210	0.2831	0.3256	0.5759	0.8878	0.9814	0.9948 (94)
Useful gains	1000.7944	1220.9804	1369.6137	1395.8832	1166.9413	781.0598	502.3736	529.0585	840.3603	1082.2934	1008.6465	943.7814 (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	2177.0538	2116.6348	1919.0424	1591.0360	1204.1823	784.1408	502.6139	529.5878	857.2481	1337.1284	1786.7655	2164.2335 (97)
Space heating kWh	875.1370	601.8798	408.7750	140.5101	27.7073	0.0000	0.0000	0.0000	0.0000	189.5972	560.2457	908.0163 (98a)
Space heating requirement - total per year (kWh/year)												3711.8683
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	875.1370	601.8798	408.7750	140.5101	27.7073	0.0000	0.0000	0.0000	0.0000	189.5972	560.2457	908.0163 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3711.8683
Space heating per m2										(98c) / (4) =		25.4203 (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 %)												87.5000 (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	875.1370	601.8798	408.7750	140.5101	27.7073	0.0000	0.0000	0.0000	0.0000	189.5972	560.2457	908.0163 (98)
Space heating efficiency (main heating system 1)	87.5000	87.5000	87.5000	87.5000	87.5000	0.0000	0.0000	0.0000	0.0000	87.5000	87.5000	87.5000 (210)
Space heating fuel (main heating system)	1000.1565	687.8626	467.1714	160.5829	31.6654	0.0000	0.0000	0.0000	0.0000	216.6826	640.2808	1037.7330 (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	302.9745	268.1336	285.0884	250.9204	243.4786	219.6364	216.8108	225.1947	227.4428	253.3560	269.1215	299.6753 (64)
Efficiency of water heater (217)m	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	92.5000 (216)
Fuel for water heating, kWh/month	346.2566	306.4384	325.8154	286.7662	278.2613	251.0130	247.7837	257.3654	259.9346	289.5497	307.5674	342.4861 (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	41.6711	37.6384	41.6711	40.3269	41.6711	40.3269	41.6711	41.6711	40.3269	41.6711	40.3269	41.6711 (231)
Lighting	32.4566	26.0379	23.4442	17.1763	13.2674	10.8396	12.1030	15.7319	20.4342	26.8108	30.2828	33.3587 (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)												

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(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(233b)
(233b)m	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)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234b)
(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)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235b)
(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)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235d)
(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											4242.1352	(211)
Space heating fuel - main system 2											0.0000	(213)
Space heating fuel - secondary											0.0000	(215)
Efficiency of water heater											92.5000	
Water heating fuel used											3499.2377	(219)
Space cooling fuel											0.0000	(221)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)												
mechanical ventilation fans (SFP = 0.9940)											449.6440	(230a)
central heating pump											41.0000	(230c)
Total electricity for the above, kWh/year											490.6440	(231)
Electricity for lighting (calculated in Appendix L)											261.9435	(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											8493.9604	(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	4242.1352	0.2100	890.8484	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3499.2377	0.2100	734.8399	(264)
Space and water heating			1625.6883	(265)
Pumps, fans and electric keep-hot	490.6440	0.1387	68.0584	(267)
Energy for lighting	261.9435	0.1443	37.8065	(268)
Total CO2, kg/year			1731.5532	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			11.8600	(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	4242.1352	1.1300	4793.6128	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3499.2377	1.1300	3954.1386	(278)
Space and water heating			8747.7514	(279)
Pumps, fans and electric keep-hot	490.6440	1.5128	742.2463	(281)
Energy for lighting	261.9435	1.5338	401.7777	(282)
Total Primary energy kWh/year			9891.7754	(286)
Dwelling Primary energy Rate (DPER)			67.7400	(287)

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

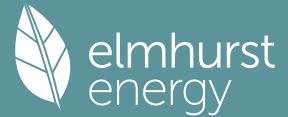
1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	61.7800 (1b)	x	2.6100 (2b)	=	161.2458 (1b) - (3b)	
First floor	52.0400 (1c)	x	2.6900 (2c)	=	139.9876 (1c) - (3c)	
Second floor	32.2000 (1d)	x	2.1600 (2d)	=	69.5520 (1d) - (3d)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	146.0200				(4)	
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	370.7854 (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	4 * 10 =	40.0000 (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) = 40.0000 / (5) = 0.1079 (8)
Pressure test Yes
Pressure Test Method Blower Door
Measured/design AP50 5.0000 (17)
Infiltration rate 0.3579 (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) = 0.3042 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate													
	0.3879	0.3802	0.3726	0.3346	0.3270	0.2890	0.2890	0.2814	0.3042	0.3270	0.3422	0.3574	(22b)
Effective ac	0.5752	0.5723	0.5694	0.5560	0.5535	0.5418	0.5418	0.5396	0.5463	0.5535	0.5586	0.5639	(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			2.1000	1.0000	2.1000			(26)
TER Opening Type			32.4400	1.1450	37.1450			(27)
TER Roof Window			1.7600	1.1450	2.8015			(27a)
FT01			61.7800	0.1300	8.0314			(28a)
WT01 Brick	94.6900	25.6300	69.0600	0.1800	12.4308			(29a)
WT02 Tile hung	93.4900	7.4300	86.0600	0.1800	15.4908			(29a)
WT03 Dormer	7.9800	1.4800	6.5000	0.1800	1.1700			(29a)
RT01 Ceiling	4.0500		4.0500	0.1100	0.4455			(30)
RT03 Flat	8.3100	1.0800	7.2300	0.1100	0.7953			(30)
RT02 Rafter	73.0200	0.6800	72.3400	0.1100	7.9574			(30)
Total net area of external elements Aum(A, m2)			343.3200					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 88.3677			(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	23.3200	0.0500	1.1660	
E3 Sill	18.5700	0.0500	0.9285	
E4 Jamb	49.9500	0.0500	2.4975	
E5 Ground floor (normal)	36.2800	0.1600	5.8048	
E6 Intermediate floor within a dwelling	31.9900	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	3.3300	0.0600	0.1998	
E12 Gable (insulation at ceiling level)	0.0000	0.0600	0.0000	
E16 Corner (normal)	23.8100	0.0900	2.1429	
E17 Corner (inverted - internal area greater than external area)	2.6100	-0.0900	-0.2349	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	14.3700	0.5600	8.0472	
E24 Eaves (insulation at ceiling level - inverted)	9.5600	0.2400	2.2944	
E20 Exposed floor (normal)	0.0000	0.3200	0.0000	
E11 Eaves (insulation at rafter level)	17.9200	0.0400	0.7168	
E13 Gable (insulation at rafter level)	11.0200	0.0800	0.8816	
R1 Head of roof window	0.7500	0.0800	0.0600	
R2 Sill of roof window	0.7500	0.0600	0.0450	
R3 Jamb of roof window	1.8000	0.0800	0.1440	
R4 Ridge (vaulted ceiling)	8.9600	0.0800	0.7168	
R7 Flat ceiling (inverted)	2.9600	0.0400	0.1184	
R9 Roof to wall (flat ceiling)	6.5200	0.0400	0.2608	

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

25.7896 (36)

Point Thermal Bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 114.1573 (37)

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

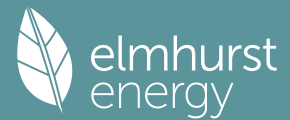
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	70.3828	70.0254	69.6751	68.0298	67.7219	66.2889	66.2889	66.0236	66.8409	67.7219	68.3447	68.9957	(38)
Heat transfer coeff	184.5401	184.1827	183.8324	182.1871	181.8793	180.4463	180.4463	180.1809	180.9982	181.8793	182.5020	183.1531	(39)
Average = Sum(39)m / 12 =												182.1856	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	1.2638	1.2614	1.2590	1.2477	1.2456	1.2358	1.2358	1.2339	1.2395	1.2456	1.2498	1.2543	(40)
HLP (average)												1.2477	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9278 (42)
Hot water usage for mixer showers													
	73.3090	72.2073	70.6020	67.5304	65.2636	62.7357	61.2989	62.8921	64.6386	67.3527	70.4903	73.0282	(42a)
Hot water usage for baths													
	31.6485	31.1785	30.5166	29.2962	28.3823	27.3691	26.8217	27.4790	28.1946	29.2789	30.5244	31.5415	(42b)
Hot water usage for other uses													
	44.6134	42.9911	41.3688	39.7465	38.1241	36.5018	36.5018	38.1241	39.7465	41.3688	42.9911	44.6134	(42c)
Average daily hot water use (litres/day)													137.4892 (43)
Daily hot water use													
	149.5709	146.3769	142.4873	136.5730	131.7701	126.6066	124.6224	128.4952	132.5796	138.0004	144.0058	149.1830	(44)
Energy conte	236.8838	208.4387	218.9977	186.9616	177.3879	155.6776	150.7200	159.1039	163.4840	187.2652	205.1627	233.5846	(45)
Energy content (annual)										Total = Sum(45)m =			2283.6676
Distribution loss (46)m = 0.15 x (45)m													
	35.5326	31.2658	32.8497	28.0442	26.6082	23.3516	22.6080	23.8656	24.5226	28.0898	30.7744	35.0377	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6525 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8924 (55)
Total storage loss													

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If cylinder contains dedicated solar storage	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (56)
Primary loss	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (57)
Combi loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
WWHRS	287.8098	254.4365	269.9238	236.2449	228.3139	204.9609	201.6461	210.0300	212.7673	238.1913	254.4460	284.5107 (62)
PV diverter	-33.5138	-29.6399	-31.0372	-25.7000	-23.9515	-20.4955	-19.2112	-20.4292	-21.2054	-24.9988	-28.3206	-32.8932 (63a)
Solar input	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
12Total per year (kWh/year)	254.2960	224.7966	238.8866	210.5449	204.3624	184.4654	182.4349	189.6008	191.5618	213.1925	226.1253	251.6175 (64)
Electric shower(s)	Total per year (kWh/year) = Sum(64)m =											2571.8845 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =											0.0000 (64a)
	119.5047	106.1041	113.5576	101.5914	99.7223	91.1894	90.8553	93.6429	93.7851	103.0065	107.6432	118.4077 (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	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	159.4659	176.5515	159.4659	164.7814	159.4659	164.7814	159.4659	159.4659	164.7814	159.4659	164.7814	159.4659	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	316.1589	319.4397	311.1723	293.5721	271.3550	250.4740	236.5242	233.2435	241.5108	259.1111	281.3282	302.2092	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	(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)	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	(71)
Water heating gains (Table 5)	160.6246	157.8930	152.6312	141.0991	134.0354	126.6520	122.1173	125.8641	130.2570	138.4497	149.5045	159.1502	(72)
Total internal gains	706.1661	723.8008	693.1860	669.3693	634.7729	608.8240	585.0240	585.4901	603.4659	626.9432	665.5307	690.7419	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W
Northeast	12.1800	11.2829	0.6300	0.7000	0.7700	41.9992 (75)
East	1.1500	19.6403	0.6300	0.7000	0.7700	6.9027 (76)
Southeast	6.4400	36.7938	0.6300	0.7000	0.7700	72.4157 (77)
South	1.1500	46.7521	0.6300	0.7000	0.7700	16.4312 (78)
Southwest	11.5200	36.7938	0.6300	0.7000	0.7700	129.5386 (79)
Southwest	1.7600	26.0000	0.6300	0.7000	1.0000	18.1621 (82)

Solar gains	285.4496	507.6282	748.2835	1012.1080	1207.4899	1230.2536	1173.0614	1023.1349	839.3351	575.8245	345.8761	241.6735	(83)
Total gains	991.6157	1231.4290	1441.4695	1681.4773	1842.2627	1839.0777	1758.0854	1608.6250	1442.8010	1202.7677	1011.4068	932.4153	(84)

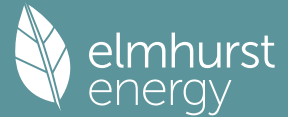
7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)	21.0000 (85)											
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	54.9489	55.0555	55.1604	55.6586	55.7528	56.1956	56.1956	56.2783	56.0242	55.7528	55.5625	55.3650
alpha	4.6633	4.6704	4.6774	4.7106	4.7169	4.7464	4.7464	4.7519	4.7349	4.7169	4.7042	4.6910
util living area	0.9966	0.9903	0.9733	0.9158	0.7881	0.6004	0.4459	0.5043	0.7613	0.9535	0.9920	0.9974 (86)
MIT	19.4942	19.7438	20.0911	20.5207	20.8271	20.9633	20.9927	20.9873	20.8913	20.4626	19.8944	19.4532 (87)
Th 2	19.8693	19.8712	19.8731	19.8820	19.8837	19.8915	19.8915	19.8929	19.8885	19.8837	19.8803	19.8768 (88)
util rest of house	0.9954	0.9870	0.9642	0.8882	0.7274	0.5078	0.3365	0.3885	0.6742	0.9322	0.9888	0.9965 (89)
MIT 2	18.1286	18.4475	18.8861	19.4126	19.7463	19.8721	19.8894	19.8888	19.8189	19.3584	18.6476	18.0814 (90)
Living area fraction	18.3148	18.6243	19.0504	19.5637	19.8937	20.0209	20.0398	20.0386	19.9652	19.5090	18.8176	18.2685 (91)
MIT	18.3148	18.6243	19.0504	19.5637	19.8937	20.0209	20.0398	20.0386	19.9652	19.5090	18.8176	18.2685 (92)
Temperature adjustment	18.3148	18.6243	19.0504	19.5637	19.8937	20.0209	20.0398	20.0386	19.9652	19.5090	18.8176	18.2685 (93)
adjusted MIT	18.3148	18.6243	19.0504	19.5637	19.8937	20.0209	20.0398	20.0386	19.9652	19.5090	18.8176	18.2685 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9929	0.9819	0.9553	0.8787	0.7280	0.5191	0.3514	0.4041	0.6809	0.9228	0.9842	0.9946	(94)
Ext temp.	984.5887	1209.0871	1377.0853	1477.5891	1341.1676	954.6748	617.8262	650.1153	982.3322	1109.8563	995.4416	927.3454	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Space heating kWh	2586.2986	2527.7764	2307.1782	1942.7797	1490.2620	978.1762	620.7019	655.6036	1061.5833	1620.3583	2138.4898	2576.6881	(97)
Space heating requirement - total per year (kWh/year)	1191.6721	886.1592	691.9891	334.9373	110.9262	0.0000	0.0000	0.0000	0.0000	379.8135	822.9947	1227.1110	(98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Solar heating contribution - total per year (kWh/year)	1191.6721	886.1592	691.9891	334.9373	110.9262	0.0000	0.0000	0.0000	0.0000	379.8135	822.9947	1227.1110	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1191.6721	886.1592	691.9891	334.9373	110.9262	0.0000	0.0000	0.0000	0.0000	379.8135	822.9947	1227.1110	(98c)
Space heating per m ²	(98c) / (4) =											38.6632	(99)

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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	1191.6721	886.1592	691.9891	334.9373	110.9262	0.0000	0.0000	0.0000	0.0000	379.8135	822.9947	1227.1110	(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)	1291.0857	960.0858	749.7174	362.8790	120.1801	0.0000	0.0000	0.0000	0.0000	411.4989	891.6519	1329.4810	(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 requirement	254.2960	224.7966	238.8866	210.5449	204.3624	184.4654	182.4349	189.6008	191.5618	213.1925	226.1253	251.6175	(64)
Efficiency of water heater (217)m	87.0730	86.8187	86.3022	85.0957	82.7507	79.8000	79.8000	79.8000	79.8000	85.3398	86.6926	79.8000	(216)
Fuel for water heating, kWh/month	292.0493	258.9264	276.8025	247.4214	246.9615	231.1597	228.6151	237.5950	240.0524	249.8160	260.8358	288.7907	(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	33.1339	26.5812	23.9334	17.5347	13.5443	11.0658	12.3555	16.0602	20.8606	27.3703	30.9146	34.0548	(232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-56.2878	-78.5960	-111.8786	-124.4773	-133.0408	-123.6428	-121.9826	-115.6502	-104.4266	-89.1120	-61.5578	-48.7424	(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	-34.1703	-71.5939	-141.8142	-212.3491	-280.2269	-281.4691	-278.2832	-235.9880	-173.3724	-102.3242	-45.5908	-27.0542	(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												6116.5799	(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												3059.0258	(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)												267.4092	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3053.6313	(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												6475.3836	(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	6116.5799	0.2100	1284.4818 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3059.0258	0.2100	642.3954 (264)
Space and water heating			1926.8772 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	267.4092	0.1443	38.5954 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1169.3948	0.1348	-157.6589
PV Unit electricity exported	-1884.2364	0.1260	-237.3673
Total			-395.0262 (269)
Total CO2, kg/year			1582.3757 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.8400 (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	6116.5799	1.1300	6911.7353 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3059.0258	1.1300	3456.6991 (278)
Space and water heating			10368.4345 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	267.4092	1.5338	410.1612 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1169.3948	1.4983	-1752.0909
PV Unit electricity exported	-1884.2364	0.4624	-871.3064
Total			-2623.3973 (283)
Total Primary energy kWh/year			8285.2992 (286)

Target Primary Energy Rate (TPER)

56.7400 (287)

Summary for Input Data

Plot Reference	AT07	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	86 B	DER	10.57	TER	9.76
Environmental	89 B	% DER < TER			-8.30
CO ₂ Emissions (t/year)	1.72	DFEE	41.31	TFEE	43.15
Compliance Check	See BREL	% DFEE < TFEE			4.28
% DPER < TPER	-18.58	DPER	60.69	TPER	51.18

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	3	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	No	

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	40.98 m	78.04 m ²	2.61 m
	2nd Storey:	35.36 m	68.92 m ²	2.69 m
		14.56 m	40.30 m ²	2.18 m

8.0 Living Area	15.80	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
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		220.62	188.37	0.00	None	32.25	Enter Gross Area
	WT03 Dormer	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		6.38	3.42	0.00	None	2.96	Enter Gross Area

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
	RT01 Ceiling	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	7.25	7.25	None	0.00	Enter Gross Area	0.00
	RT03 Flat	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	9.13	8.05	None	0.00	Enter Gross Area	1.08
	RT02 Rafter	External Slope Roof	Plasterboard, insulated slope	0.11	9.00	86.30	82.90	None	0.00	Enter Gross Area	3.40

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	78.04

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D001	Solid door	WT01 Brick	South	2.10	
D002	DG Win	WT01 Brick	North	5.22	
W001	DG Win	WT01 Brick	South	2.72	
W002	DG Win	WT01 Brick	South	2.72	
W003	DG Win	WT01 Brick	North	0.82	
W004	DG Win	WT01 Brick	West	2.44	
W005	DG Win	WT01 Brick	East	1.67	
D003	DG Win	WT01 Brick	North	5.22	
W006	DG Win	WT01 Brick	South	1.50	
W008	DG Win	WT01 Brick	South	1.50	
W009	DG Win	WT01 Brick	West	1.50	
W007	DG Win	WT01 Brick	South	1.50	
W010	DG Win	WT01 Brick	North	1.67	
W011	DG Win	WT01 Brick	North	1.67	
W012	DG Win	WT03 Dormer	South	1.48	
W013	DG Win	WT03 Dormer	South	1.48	
RL01	Roof light	RT02 Rafter	North	0.68	0
RL02	Roof light	RT02 Rafter	North	0.68	0
RL03	Roof light	RT02 Rafter	North	0.68	0
RL04	Roof light	RT02 Rafter	North	0.68	0
RL05	Roof light	RT02 Rafter	North	0.68	0
RL06	Roof light	RT03 Flat	North	1.08	0

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	23.26	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	17.29	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	46.20	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	50.04	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	40.31	0.00	0.00 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	18.29	0.04	0.04 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	17.09	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	34.41	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	13.21	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	13.07	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	3.25	0.24	0.24 Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	0.00	0.32	0.32 Table R2	No
R1 Head of roof window	Non Gov Approved Schemes	3.75	0.08	0.08 Table R2	No
R2 Sill of roof window	Non Gov Approved Schemes	3.75	0.06	0.06 Table R2	No
R3 Jamb of roof window	Non Gov Approved Schemes	9.00	0.08	0.08 Table R2	No
R4 Ridge (vaulted ceiling)	Non Gov Approved Schemes	9.28	0.08	0.08 Table R2	No
R7 Flat ceiling (inverted)	Non Gov Approved Schemes	5.49	0.04	0.04 Table R2	No
R9 Roof to wall (flat ceiling)	Non Gov Approved Schemes	6.36	0.04	0.04 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)

Summary for Input Data

Duct Installation Specification	Level 1				
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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

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 Fixed Lighting	No
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Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1

Manufacturer		
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	102	
In Winter	92.50	
In Summer	92.50	
Model Name		
Manufacturer		
Controls SAP Code	2110	
Controls description	Time and temperature zone control by arrangement	
Delayed Start Stat	No	
Burner Control	Modulating	
Flue Type	Balanced	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Unknown	
Boiler Interlock	No	

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No

Summary for Input Data

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 mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

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

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT07				Issued on Date	07/05/2026	
Assessment Reference	Be Lean			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	86 B		DER	10.57		TER	9.76
Environmental	89 B		% DER < TER				-8.30
CO ₂ Emissions (t/year)	1.72		DFEE	41.31		TFEE	43.15
Compliance Check	See BREL		% DFEE < TFEE				4.28
% DPER < TPER	-18.58		DPER	60.69		TPER	51.18
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	78.0400 (1b)	x 2.6100 (2b)	= 203.6844 (1b) - (3b)
First floor	68.9200 (1c)	x 2.6900 (2c)	= 185.3948 (1c) - (3c)
Second floor	40.3000 (1d)	x 2.1800 (2d)	= 87.8540 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	187.2600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	476.9332 (5)

2. Ventilation rate

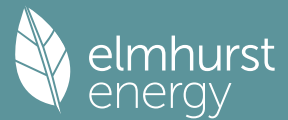
	m ³ per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			33.1100	1.1450	37.9122		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof light			4.4800	1.1450	5.1298		(27a)
FT01			78.0400	0.1300	10.1452		(28a)
WT01 Brick	220.6200	32.2500	188.3700	0.1800	33.9066		(29a)
WT03 Dormer	6.3800	2.9600	3.4200	0.1800	0.6156		(29a)
RT01 Ceiling	7.2500		7.2500	0.1100	0.7975		(30)
RT03 Flat	9.1300	1.0800	8.0500	0.1100	0.8855		(30)
RT02 Rafter	86.3000	3.4000	82.9000	0.1100	9.1190		(30)
Total net area of external elements A _{um} (A, m ²)			407.7200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	100.6114		(33)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							250.0000 (35)

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List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	23.2600	0.0500	1.1630
E3 Sill	17.2900	0.0500	0.8645
E4 Jamb	46.2000	0.0500	2.3100
E5 Ground floor (normal)	50.0400	0.1600	8.0064
E6 Intermediate floor within a dwelling	40.3100	0.0000	0.0000
E11 Eaves (insulation at rafter level)	18.2900	0.0400	0.7316
E13 Gable (insulation at rafter level)	17.0900	0.0800	1.3672
E16 Corner (normal)	34.4100	0.0900	3.0969
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	13.0700	0.5600	7.3192
E24 Eaves (insulation at ceiling level - inverted)	3.2500	0.2400	0.7800
E20 Exposed floor (normal)	0.0000	0.3200	0.0000
R1 Head of roof window	3.7500	0.0800	0.3000
R2 Sill of roof window	3.7500	0.0600	0.2250
R3 Jamb of roof window	9.0000	0.0800	0.7200
R4 Ridge (vaulted ceiling)	9.2800	0.0800	0.7424
R7 Flat ceiling (inverted)	5.4900	0.0400	0.2196
R9 Roof to wall (flat ceiling)	6.3600	0.0400	0.2544
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			26.9113 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	127.5227 (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	41.9537	41.4521	40.9504	38.4420	37.9403	35.4320	35.4320	34.9303	36.4353	37.9403	38.9437	39.9470 (38)
Heat transfer coeff	169.4764	168.9747	168.4731	165.9647	165.4630	162.9546	162.9546	162.4530	163.9580	165.4630	166.4664	167.4697 (39)
Average = Sum(39)m / 12 =												165.8393
HLP	0.9050	0.9024	0.8997	0.8863	0.8836	0.8702	0.8702	0.8675	0.8756	0.8836	0.8890	0.8943 (40)
HLP (average)												0.8856
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

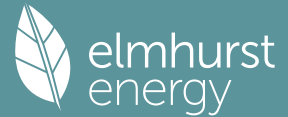
4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9853 (42)
Hot water usage for mixer showers	74.2738	73.1577	71.5311	68.4191	66.1225	63.5614	62.1056	63.7198	65.4893	68.2392	71.4180	73.9893 (42a)
Hot water usage for baths	32.0634	31.5872	30.9166	29.6802	28.7544	27.7278	27.1733	27.8392	28.5642	29.6627	30.9246	31.9550 (42b)
Hot water usage for other uses	45.2027	43.5589	41.9152	40.2715	38.6277	36.9840	36.9840	38.6277	40.2715	41.9152	43.5589	45.2027 (42c)
Average daily hot water use (litres/day)												139.2991 (43)
Daily hot water use	151.5399	148.3038	144.3630	138.3708	133.5047	128.2732	126.2629	130.1867	134.3250	139.8171	145.9015	151.1469 (44)
Energy conte	240.0022	211.1826	221.8805	189.4227	179.7229	157.7269	152.7041	161.1984	165.6361	189.7304	207.8635	236.6596 (45)
Energy content (annual)										Total = Sum(45)m =		2313.7298
Distribution loss (46)m = 0.15 x (45)m	36.0003	31.6774	33.2821	28.4134	26.9584	23.6590	22.9056	24.1798	24.8454	28.4596	31.1795	35.4989 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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	306.0929	270.8775	287.9713	253.3815	245.8137	221.6857	218.7948	227.2891	229.5949	255.8212	271.8223	302.7503 (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	306.0929	270.8775	287.9713	253.3815	245.8137	221.6857	218.7948	227.2891	229.5949	255.8212	271.8223	302.7503 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		3091.8952 (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	132.6733	117.9741	126.6479	114.1501	112.6305	103.6112	103.6467	106.4711	106.2410	115.9580	120.2817	131.5619 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	181.7521	201.2255	181.7521	187.8105	181.7521	187.8105	181.7521	181.7521	187.8105	181.7521	187.8105	181.7521 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	358.7705	362.4934	353.1118	333.1394	307.9279	284.2326	268.4027	264.6798	274.0614	294.0338	319.2453	342.9406 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128 (71)
Water heating gains (Table 5)	178.3244	175.5567	170.2256	158.5418	151.3851	143.9045	139.3101	143.1063	147.5570	155.8575	167.0579	176.8305 (72)
Total internal gains	789.6267	810.0554	775.8693	750.2714	711.8448	683.7273	657.2446	657.3179	677.2087	702.4231	744.8934	772.3030 (73)

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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
North						14.6000	10.6334	0.6300	0.7000	0.7700		47.4457 (74)
East						1.6700	19.6403	0.6300	0.7000	0.7700		10.0239 (76)
South						12.9000	46.7521	0.6300	0.7000	0.7700		184.3157 (78)
West						3.9400	19.6403	0.6300	0.7000	0.7700		23.6491 (80)
North						4.4800	26.0000	0.6300	0.7000	1.0000		46.2309 (82)
Solar gains	311.6653	554.4223	817.7703	1106.9987	1321.5401	1346.8249	1284.0613	1119.3755	917.5704	629.0357	377.6713	263.8502 (83)
Total gains	1101.2920	1364.4777	1593.6396	1857.2701	2033.3849	2030.5522	1941.3059	1776.6934	1594.7790	1331.4588	1122.5647	1036.1531 (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	76.7314	76.9592	77.1884	78.3550	78.5926	79.8024	79.8024	80.0488	79.3140	78.5926	78.1189	77.6509
alpha	6.1154	6.1306	6.1459	6.2237	6.2395	6.3202	6.3202	6.3366	6.2876	6.2395	6.2079	6.1767
util living area	0.9981	0.9927	0.9736	0.8928	0.7195	0.5099	0.3689	0.4196	0.6835	0.9459	0.9942	0.9987 (86)
MIT	20.1713	20.3352	20.5485	20.7923	20.9160	20.9474	20.9505	20.9502	20.9319	20.7420	20.4100	20.1488 (87)
Th 2	20.1632	20.1655	20.1678	20.1792	20.1815	20.1929	20.1929	20.1952	20.1883	20.1815	20.1769	20.1723 (88)
util rest of house	0.9975	0.9904	0.9654	0.8649	0.6675	0.4473	0.3015	0.3467	0.6132	0.9249	0.9920	0.9982 (89)
MIT 2	19.1812	19.3920	19.6619	19.9615	20.0909	20.1280	20.1297	20.1320	20.1132	19.9126	19.4977	19.1599 (90)
Living area fraction	19.2648	19.4715	19.7367	20.0316	20.1605	20.1971	20.1990	20.2010	20.1822	19.9826	19.5747	19.2433 (91)
MIT	19.2648	19.4715	19.7367	20.0316	20.1605	20.1971	20.1990	20.2010	20.1822	19.9826	19.5747	19.2433 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2648	19.4715	19.7367	20.0316	20.1605	20.1971	20.1990	20.2010	20.1822	19.9826	19.5747	19.2433 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9965	0.9879	0.9602	0.8593	0.6661	0.4476	0.3020	0.3473	0.6127	0.9186	0.9898	0.9976 (94)
Useful gains	1097.4882	1347.9203	1530.2157	1595.8996	1354.3806	908.8750	586.2560	616.9917	977.0576	1223.1104	1111.1042	1033.6253 (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	2536.1769	2462.2229	2230.0260	1847.4489	1399.8985	912.0776	586.4681	617.4894	997.2331	1552.4775	2076.6107	2519.2976 (97)
Space heating kWh	1070.3844	748.8113	520.6588	181.1156	33.8653	0.0000	0.0000	0.0000	0.0000	245.0492	695.1647	1105.3402 (98a)
Space heating requirement - total per year (kWh/year)												4600.3894
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	1070.3844	748.8113	520.6588	181.1156	33.8653	0.0000	0.0000	0.0000	0.0000	245.0492	695.1647	1105.3402 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4600.3894
Space heating per m ²										(98c) / (4) =		24.5669 (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 %)												87.5000 (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	1070.3844	748.8113	520.6588	181.1156	33.8653	0.0000	0.0000	0.0000	0.0000	245.0492	695.1647	1105.3402 (98)
Space heating efficiency (main heating system 1)	87.5000	87.5000	87.5000	87.5000	87.5000	0.0000	0.0000	0.0000	0.0000	87.5000	87.5000	87.5000 (210)
Space heating fuel (main heating system)	1223.2964	855.7844	595.0387	206.9892	38.7032	0.0000	0.0000	0.0000	0.0000	280.0562	794.4739	1263.2459 (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	306.0929	270.8775	287.9713	253.3815	245.8137	221.6857	218.7948	227.2891	229.5949	255.8212	271.8223	302.7503 (64)
Efficiency of water heater	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000 (216)
Fuel for water heating, kWh/month	349.8205	309.5743	329.1100	289.5789	280.9299	253.3550	250.0512	259.7590	262.3942	292.3671	310.6541	346.0004 (219)
Space cooling fuel requirement	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	52.6038	47.5131	52.6038	50.9069	52.6038	50.9069	52.6038	52.6038	50.9069	52.6038	50.9069	52.6038 (231)
Lighting	39.8626	31.9793	28.7938	21.0956	16.2948	13.3130	14.8647	19.3217	25.0970	32.9286	37.1927	40.9705 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)												

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(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												5257.5879	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												92.5000	
Water heating fuel used												3533.5945	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)													
mechanical ventilation fans (SFP = 0.9940)												578.3674	(230a)
central heating pump												41.0000	(230c)
Total electricity for the above, kWh/year												619.3674	(231)
Electricity for lighting (calculated in Appendix L)												321.7144	(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												9732.2642	(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	5257.5879	0.2100	1104.0935	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3533.5945	0.2100	742.0549	(264)
Space and water heating			1846.1483	(265)
Pumps, fans and electric keep-hot	619.3674	0.1387	85.9139	(267)
Energy for lighting	321.7144	0.1443	46.4333	(268)
Total CO2, kg/year			1978.4955	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			10.5700	(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	5257.5879	1.1300	5941.0743	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3533.5945	1.1300	3992.9618	(278)
Space and water heating			9934.0362	(279)
Pumps, fans and electric keep-hot	619.3674	1.5128	936.9789	(281)
Energy for lighting	321.7144	1.5338	493.4562	(282)
Total Primary energy kWh/year			11364.4713	(286)
Dwelling Primary energy Rate (DPER)			60.6900	(287)

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

CALCULATION OF TARGET EMISSIONS

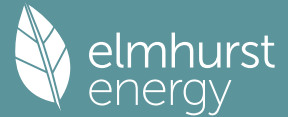
1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	78.0400 (1b)	x	2.6100 (2b)	=	203.6844 (1b) - (3b)	
First floor	68.9200 (1c)	x	2.6900 (2c)	=	185.3948 (1c) - (3c)	
Second floor	40.3000 (1d)	x	2.1800 (2d)	=	87.8540 (1d) - (3d)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	187.2600					
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	476.9332 (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	4 * 10 =	40.0000 (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) =	40.0000 / (5) =	0.0839 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)

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Infiltration rate 0.3339 (18)
Number of sides sheltered 2 (19)
Shelter factor (20) = $1 - [0.075 \times (19)] = 0.8500$ (20)
Infiltration rate adjusted to include shelter factor (21) = (18) x (20) = 0.2838 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate													
	0.3618	0.3547	0.3476	0.3122	0.3051	0.2696	0.2696	0.2625	0.2838	0.3051	0.3193	0.3335	(22b)
Effective ac	0.5655	0.5629	0.5604	0.5487	0.5465	0.5363	0.5363	0.5345	0.5403	0.5465	0.5510	0.5556	(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			2.1000	1.0000	2.1000			(26)
TER Opening Type			33.1100	1.1450	37.9122			(27)
TER Roof Window			4.4800	1.1450	7.1311			(27a)
FT01			78.0400	0.1300	10.1452			(28a)
WT01 Brick	220.6200	32.2500	188.3700	0.1800	33.9066			(29a)
WT03 Dormer	6.3800	2.9600	3.4200	0.1800	0.6156			(29a)
RT01 Ceiling	7.2500		7.2500	0.1100	0.7975			(30)
RT03 Flat	9.1300	1.0800	8.0500	0.1100	0.8855			(30)
RT02 Rafter	86.3000	3.4000	82.9000	0.1100	9.1190			(30)
Total net area of external elements Aum(A, m2)			407.7200					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 102.6127			(33)

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

250.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element	0.0000	0.0500	0.0000	
E1 Steel lintel with perforated steel base plate	23.2600	0.0500	1.1630	
E2 Other lintels (including other steel lintels)	17.2900	0.0500	0.8645	
E3 Sill	46.2000	0.0500	2.3100	
E4 Jamb	50.0400	0.1600	8.0064	
E5 Ground floor (normal)	40.3100	0.0000	0.0000	
E6 Intermediate floor within a dwelling	18.2900	0.0400	0.7316	
E11 Eaves (insulation at rafter level)	17.0900	0.0800	1.3672	
E13 Gable (insulation at rafter level)	34.4100	0.0900	3.0969	
E16 Corner (normal)	13.2100	-0.0900	-1.1889	
E17 Corner (inverted - internal area greater than external area)	0.0000	0.0600	0.0000	
E18 Party wall between dwellings	0.0000	0.0800	0.0000	
P1 Party wall - Ground floor	0.0000	0.0000	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	13.0700	0.5600	7.3192	
E24 Eaves (insulation at ceiling level - inverted)	3.2500	0.2400	0.7800	
E20 Exposed floor (normal)	0.0000	0.3200	0.0000	
R1 Head of roof window	3.7500	0.0800	0.3000	
R2 Sill of roof window	3.7500	0.0600	0.2250	
R3 Jamb of roof window	9.0000	0.0800	0.7200	
R4 Ridge (vaulted ceiling)	9.2800	0.0800	0.7424	
R7 Flat ceiling (inverted)	5.4900	0.0400	0.2196	
R9 Roof to wall (flat ceiling)	6.3600	0.0400	0.2544	

26.9113 (36)

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

Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 129.5240 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)m \times (5)$

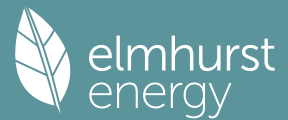
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	88.9967	88.5966	88.2045	86.3626	86.0180	84.4138	84.4138	84.1167	85.0317	86.0180	86.7151	87.4440	(38)
Heat transfer coeff	218.5207	218.1206	217.7285	215.8866	215.5420	213.9378	213.9378	213.6407	214.5557	215.5420	216.2391	216.9680	(39)
Average = Sum(39)m / 12 =												215.8850	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	1.1669	1.1648	1.1627	1.1529	1.1510	1.1425	1.1425	1.1409	1.1458	1.1510	1.1548	1.1586	(40)
HLP (average)												1.1529	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9853 (42)
Hot water usage for mixer showers													
	74.2738	73.1577	71.5311	68.4191	66.1225	63.5614	62.1056	63.7198	65.4893	68.2392	71.4180	73.9893	(42a)
Hot water usage for baths													
	32.0634	31.5872	30.9166	29.6802	28.7544	27.7278	27.1733	27.8392	28.5642	29.6627	30.9246	31.9550	(42b)
Hot water usage for other uses													
	45.2027	43.5589	41.9152	40.2715	38.6277	36.9840	36.9840	38.6277	40.2715	41.9152	43.5589	45.2027	(42c)
Average daily hot water use (litres/day)												139.2991	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	151.5399	148.3038	144.3630	138.3708	133.5047	128.2732	126.2629	130.1867	134.3250	139.8171	145.9015	151.1469	(44)
Energy conte	240.0022	211.1826	221.8805	189.4227	179.7229	157.7269	152.7041	161.1984	165.6361	189.7304	207.8635	236.6596	(45)
Energy content (annual)										Total = Sum(45)m =		2313.7298	
Distribution loss (46)m = $0.15 \times (45)m$													
	36.0003	31.6774	33.2821	28.4134	26.9584	23.6590	22.9056	24.1798	24.8454	28.4596	31.1795	35.4989	(46)
Water storage loss (or HIU loss):													
Store volume												200.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6525	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8924	(55)
Total storage loss													
	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)
If cylinder contains dedicated solar storage													
	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(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													
	290.9282	257.1804	272.8066	238.7060	230.6490	207.0102	203.6301	212.1245	214.9194	240.6565	257.1468	287.5856	(62)

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WWHRS	-33.9549	-30.0300	-31.4457	-26.0383	-24.2667	-20.7652	-19.4641	-20.6981	-21.4845	-25.3278	-28.6934	-33.3261 (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	256.9733	227.1504	241.3609	212.6677	206.3823	186.2449	184.1661	191.4264	193.4349	215.3287	228.4534	254.2595 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											2597.8485 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	120.5416	107.0164	114.5161	102.4097	100.4987	91.8708	91.5150	94.3393	94.5006	103.8262	108.5413	119.4302 (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	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	181.7521	201.2255	181.7521	187.8105	181.7521	187.8105	181.7521	181.7521	187.8105	181.7521	187.8105	181.7521	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	358.7705	362.4934	353.1118	333.1394	307.9279	284.2326	268.4027	264.6798	274.0614	294.0338	319.2453	342.9406	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	(71)
Water heating gains (Table 5)	162.0182	159.2506	153.9195	142.2357	135.0789	127.5984	123.0040	126.8002	131.2509	139.5514	150.7517	160.5244	(72)
Total internal gains	773.3206	793.7493	759.5632	733.9653	695.5387	667.4212	640.9385	641.0118	660.9025	686.1170	728.5873	755.9968	(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
North					14.6000	10.6334		0.6300	0.7000	0.7700		47.4457 (74)
East					1.6700	19.6403		0.6300	0.7000	0.7700		10.0239 (76)
South					12.9000	46.7521		0.6300	0.7000	0.7700		184.3157 (78)
West					3.9400	19.6403		0.6300	0.7000	0.7700		23.6491 (80)
North					4.4800	26.0000		0.6300	0.7000	1.0000		46.2309 (82)
Solar gains	311.6653	554.4223	817.7703	1106.9987	1321.5401	1346.8249	1284.0613	1119.3755	917.5704	629.0357	377.6713	263.8502 (83)
Total gains	1084.9859	1348.1716	1577.3335	1840.9640	2017.0788	2014.2461	1924.9998	1760.3873	1578.4729	1315.1527	1106.2586	1019.8470 (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	59.5100	59.6191	59.7265	60.2361	60.3324	60.7848	60.7848	60.8693	60.6098	60.3324	60.1379	59.9359
alpha	4.9673	4.9746	4.9818	5.0157	5.0222	5.0523	5.0523	5.0580	5.0407	5.0222	5.0092	4.9957
util living area	0.9983	0.9947	0.9840	0.9419	0.8313	0.6455	0.4822	0.5449	0.8066	0.9704	0.9958	0.9988 (86)
MIT	19.5355	19.7607	20.0833	20.4975	20.8125	20.9604	20.9925	20.9866	20.8813	20.4475	19.9109	19.4988 (87)
Th 2	19.9465	19.9483	19.9500	19.9579	19.9594	19.9663	19.9663	19.9676	19.9636	19.9594	19.9564	19.9532 (88)
util rest of house	0.9977	0.9929	0.9783	0.9214	0.7779	0.5552	0.3725	0.4294	0.7279	0.9561	0.9940	0.9983 (89)
MIT 2	18.2355	18.5243	18.9347	19.4505	19.8043	19.9444	19.9640	19.9630	19.8834	19.4012	18.7231	18.1932 (90)
Living area fraction	fLA = Living area / (4) =											0.0844 (91)
MIT	18.3452	18.6286	19.0316	19.5389	19.8894	20.0301	20.0508	20.0493	19.9676	19.4895	18.8233	18.3034 (92)
Temperature adjustment												0.0000
adjusted MIT	18.3452	18.6286	19.0316	19.5389	19.8894	20.0301	20.0508	20.0493	19.9676	19.4895	18.8233	18.3034 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	0.9963	0.9895	0.9714	0.9111	0.7738	0.5610	0.3816	0.4388	0.7283	0.9471	0.9911	0.9972 (94)
Useful gains	1080.9713	1334.0610	1532.2342	1677.2427	1560.8650	1130.0850	734.6478	772.5319	1149.5412	1245.6289	1096.3986	1017.0338 (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	3069.1562	2994.5018	2728.4902	2296.7926	1765.1508	1161.7019	738.2497	779.6427	1258.9346	1916.0619	2535.0360	3059.9778 (97)
Space heating kWh	1479.2096	1115.8162	890.0145	446.0759	151.9886	0.0000	0.0000	0.0000	0.0000	498.8021	1035.8189	1519.9503 (98a)
Space heating requirement - total per year (kWh/year)												7137.6761
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	1479.2096	1115.8162	890.0145	446.0759	151.9886	0.0000	0.0000	0.0000	0.0000	498.8021	1035.8189	1519.9503 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												7137.6761
Space heating per m2												(98c) / (4) = 38.1164 (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)

Full SAP Calculation Printout



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1479.2096	1115.8162	890.0145	446.0759	151.9886	0.0000	0.0000	0.0000	0.0000	498.8021	1035.8189	1519.9503	(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)	1602.6106	1208.9016	964.2628	483.2892	164.6680	0.0000	0.0000	0.0000	0.0000	540.4140	1122.2307	1646.7500	(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 requirement	256.9733	227.1504	241.3609	212.6677	206.3823	186.2449	184.1661	191.4264	193.4349	215.3287	228.4534	254.2595	(64)
Efficiency of water heater	87.3420	87.1378	86.7136	85.6803	83.3842	79.8000	79.8000	79.8000	79.8000	85.8795	87.0264	87.3876	(216)
Fuel for water heating, kWh/month	294.2150	260.6796	278.3425	248.2106	247.5077	233.3897	230.7845	239.8827	242.3996	250.7334	262.5104	290.9561	(217)
Space cooling fuel requirement	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)
(221)m	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	(231)
Pumps and Fa	37.7645	30.2961	27.2783	19.9852	15.4372	12.6123	14.0823	18.3047	23.7760	31.1954	35.2351	38.8141	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	-69.1056	-95.4944	-134.5237	-148.0420	-156.8396	-145.2203	-143.2168	-136.4254	-124.2376	-107.4486	-75.1971	-59.9568	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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)	-45.1603	-94.2243	-185.9390	-277.4344	-365.1969	-366.5139	-362.3956	-307.7611	-226.6759	-134.3721	-60.1521	-35.7889	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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												7733.1269	(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												3079.6118	(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)												304.7811	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3857.3225	(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												7346.1973	(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	7733.1269	0.2100	1623.9567	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3079.6118	0.2100	646.7185	(264)
Space and water heating			2270.6751	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	304.7811	0.1443	43.9893	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1395.7080	0.1351	-188.4992	
PV Unit electricity exported	-2461.6145	0.1261	-310.3577	
Total			-498.8568	(269)
Total CO2, kg/year			1827.7369	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.7600	(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	7733.1269	1.1300	8738.4334	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3079.6118	1.1300	3479.9614	(278)
Space and water heating			12218.3948	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	304.7811	1.5338	467.4834	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1395.7080	1.4992	-2092.4058	
PV Unit electricity exported	-2461.6145	0.4628	-1139.2440	
Total			-3231.6499	(283)
Total Primary energy kWh/year			9584.3291	(286)
Target Primary Energy Rate (TPER)			51.1800	(287)

Summary for Input Data

Plot Reference	AT08		Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref		
Plot Address			SAP Version	10.2

SAP Rating	82 B	DER	3.56	TER	9.70
Environmental	96 A	% DER < TER			63.30
CO ₂ Emissions (t/year)	0.62	DFEE	42.36	TFEE	43.82
Compliance Check	See BREL	% DFEE < TFEE			3.34
% DPER < TPER	26.75	DPER	37.30	TPER	50.93

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
3.0 Date Built	2026
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Enter TMP value
Thermal Mass	250.00

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	41.81 m	83.23 m²	2.61 m
	2nd Storey:	34.04 m	69.19 m²	2.69 m
		13.57 m	41.77 m²	2.65 m

8.0 Living Area	18.90	m²
-----------------	-------	----

9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		104.87	73.25	0.00	None	31.62	Enter Gross Area
	WT03 Dormer	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		7.16	4.20	0.00	None	2.96	Enter Gross Area
	WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		111.27	100.04	0.00	None	11.23	Enter Gross Area

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	RT01 Ceiling	External Plane	Plasterboard, insulated at ceiling level	0.11	9.00	2.86	2.86	None	0.00	Enter Gross Area	0.00
	RT03 Flat	External Flat	Plasterboard, insulated flat roof	0.11	9.00	11.20	11.20	None	0.00	Enter Gross Area	0.00
	RT02 Rafter	External Slope	Plasterboard, insulated slope	0.11	9.00	97.12	95.76	None	0.00	Enter Gross Area	1.36

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	83.23

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

Summary for Input Data

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	South	2.38	
D002	DG Win	WT01 Brick	North	5.22	
W001	DG Win	WT01 Brick	South East	1.10	
W002	DG Win	WT01 Brick	South	2.66	
W003	DG Win	WT01 Brick	South East	1.10	
W004	DG Win	WT01 Brick	South East	1.10	
W005	DG Win	WT01 Brick	South	2.66	
D003	DG Win	WT01 Brick	North	2.38	
W006	DG Win	WT01 Brick	South West	1.10	
W008	DG Win	WT01 Brick	West	1.67	
W009	DG Win	WT01 Brick	East	0.92	
W007	DG Win	WT01 Brick	West	2.44	
W010	DG Win	WT01 Brick	East	1.67	
W011	DG Win	WT02 Tile hung	South	2.42	
W012	DG Win	WT02 Tile hung	South	1.67	
W013	DG Win	WT02 Tile hung	South	2.42	
RL01	Roof light	RT02 Rafter	North	0.68	0
RL02	Roof light	RT02 Rafter	North	0.68	0
D004	DG Win	WT01 Brick	North	5.22	
W014	DG Win	WT02 Tile hung	North	1.48	
W015	DG Win	WT02 Tile hung	North	0.82	
W016	DG Win	WT02 Tile hung	North	2.42	
W017	DG Win	WT03 Dormer	South	1.48	
W018	DG Win	WT03 Dormer	South	1.48	

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	29.67	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	22.43	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	66.00	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	41.81	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	32.29	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	13.38	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	23.81	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	2.61	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	14.06	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	8.74	0.24	0.24 Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	0.00	0.32	0.32 Table R2	No
R1 Head of roof window	Non Gov Approved Schemes	1.50	0.08	0.08 Table R2	No
R2 Sill of roof window	Non Gov Approved Schemes	1.50	0.06	0.06 Table R2	No
R3 Jamb of roof window	Non Gov Approved Schemes	3.60	0.08	0.08 Table R2	No
R4 Ridge (vaulted ceiling)	Non Gov Approved Schemes	10.31	0.08	0.08 Table R2	No
R7 Flat ceiling (inverted)	Non Gov Approved Schemes	2.96	0.04	0.04 Table R2	No
R9 Roof to wall (flat ceiling)	Non Gov Approved Schemes	6.58	0.04	0.04 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1

Summary for Input Data

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

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes

Designed AP₅₀

3.00

m³/(h.m²) @ 50 Pa

Test Method

Blower Door

22.0 Lighting

No Fixed Lighting

No

Name
LEL

Efficacy
85.00

Power
10.00

Capacity
850.00

Count
20

24.0 Main Heating 1

SAP table

Percentage of Heat

100.00

%

Fuel Type

Electricity

SAP Code

214

In Winter

249.90

In Summer

175.10

Controls SAP Code

2207

Controls description

Time and temperature zone control by arrangement

Is MHS Pumped

Pump in heated space

Heating Pump Age

2013 or later

Heat Emitter

Radiators and Underfloor

Underfloor Heating

Yes - Pipes in thin screed

Flow Temperature

Enter value

Flow Temperature Value

35.00

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

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

Summary for Input Data

Water use <= 125 litres/person/day	Yes
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

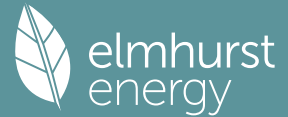
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT08				Issued on Date	07/05/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	3.56	TER	9.70		
Environmental	96 A	% DER < TER				63.30	
CO ₂ Emissions (t/year)	0.62	DFEE	42.36	TFEE	43.82		
Compliance Check	See BREL	% DFEE < TFEE				3.34	
% DPER < TPER	26.75	DPER	37.30	TPER	50.93		
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	83.2300 (1b)	x 2.6100 (2b)	= 217.2303 (1b) - (3b)
First floor	69.1900 (1c)	x 2.6900 (2c)	= 186.1211 (1c) - (3c)
Second floor	41.7700 (1d)	x 2.6500 (2d)	= 110.6905 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	194.1900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 514.0419 (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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			43.4300	1.1450	49.7290		(27)
Solid door			2.3800	1.0000	2.3800		(26)
Roof light			1.3600	1.1450	1.5573		(27a)
FT01			83.2300	0.1300	10.8199		(28a)
WT01 Brick	104.8700	31.6200	73.2500	0.1800	13.1850		(29a)
WT03 Dormer	7.1600	2.9600	4.2000	0.1800	0.7560		(29a)
WT02 Tile hung	111.2700	11.2300	100.0400	0.1800	18.0072		(29a)
RT01 Ceiling	2.8600		2.8600	0.1100	0.3146		(30)
RT03 Flat	11.2000		11.2000	0.1100	1.2320		(30)
RT02 Rafter	97.1200	1.3600	95.7600	0.1100	10.5336		(30)
Total net area of external elements Aum(A, m ²)			417.7100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	108.5146		(33)

Full SAP Calculation Printout

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

250.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element	0.0000	0.0500	0.0000
E1 Steel lintel with perforated steel base plate	29.6700	0.0500	1.4835
E2 Other lintels (including other steel lintels)	22.4300	0.0500	1.1215
E3 Sill	66.0000	0.0500	3.3000
E4 Jamb	41.8100	0.1600	6.6896
E5 Ground floor (normal)	32.2900	0.0000	0.0000
E6 Intermediate floor within a dwelling	0.0000	0.0600	0.0000
E10 Eaves (insulation at ceiling level)	13.3800	0.0800	1.0704
E13 Gable (insulation at rafter level)	23.8100	0.0900	2.1429
E16 Corner (normal)	2.6100	-0.0900	-0.2349
E17 Corner (inverted - internal area greater than external area)	0.0000	0.0600	0.0000
E18 Party wall between dwellings	0.0000	0.0800	0.0000
P1 Party wall - Ground floor	0.0000	0.0000	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.1200	0.0000
P4 Party wall - Roof (insulation at ceiling level)	14.0600	0.5600	7.8736
E15 Flat roof with parapet	8.7400	0.2400	2.0976
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.3200	0.0000
E20 Exposed floor (normal)	1.5000	0.0800	0.1200
R1 Head of roof window	1.5000	0.0600	0.0900
R2 Sill of roof window	3.6000	0.0800	0.2880
R3 Jamb of roof window	10.3100	0.0800	0.8248
R4 Ridge (vaulted ceiling)	2.9600	0.0400	0.1184
R7 Flat ceiling (inverted)	6.5800	0.0400	0.2632
R9 Roof to wall (flat ceiling)			

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

27.2486 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 135.7632 (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	45.2180	44.6773	44.1366	41.4331	40.8924	38.1888	38.1888	37.6481	39.2702	40.8924	41.9738	43.0552
Heat transfer coeff	180.9812	180.4405	179.8998	177.1962	176.6555	173.9520	173.9520	173.4113	175.0334	176.6555	177.7369	178.8183
Average = Sum(39)m / 12 =												177.0610

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9320	0.9292	0.9264	0.9125	0.9097	0.8958	0.8958	0.8930	0.9014	0.9097	0.9153	0.9208
HLP (average)												0.9118
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

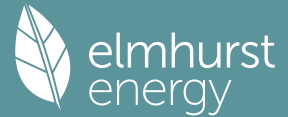
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9944 (42)
Hot water usage for mixer showers													
74.4254	73.3069	71.6771	68.5587	66.2574	63.6910	62.2323	63.8498	65.6229	68.3784	71.5637	74.1402	74.1402	(42a)
Hot water usage for baths													
32.1286	31.6514	30.9795	29.7406	28.8129	27.7842	27.2286	27.8958	28.6223	29.7230	30.9874	32.0199	32.0199	(42b)
Hot water usage for other uses													
45.2952	43.6481	42.0010	40.3539	38.7068	37.0597	37.0597	38.7068	40.3539	42.0010	43.6481	45.2952	45.2952	(42c)
Average daily hot water use (litres/day)													139.5834 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	151.8491	148.6064	144.6576	138.6532	133.7771	128.5349	126.5206	130.4524	134.5991	140.1024	146.1993	151.4554	(44)
Energy conte	240.4919	211.6136	222.3333	189.8092	180.0897	158.0487	153.0157	161.5273	165.9741	190.1176	208.2877	237.1425	(45)
Energy content (annual)										Total = Sum(45)m =		2318.4512	
Distribution loss (46)m = 0.15 x (45)m													
36.0738	31.7420	33.3500	28.4714	27.0134	23.7073	22.9524	24.2291	24.8961	28.5176	31.2432	35.5714	35.5714	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.7200 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.9288 (55)
Total storage loss													
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(56)
If cylinder contains dedicated solar storage													
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980	(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													
306.5827	271.3084	288.4240	253.7680	246.1804	222.0075	219.1064	227.6181	229.9329	256.2084	272.2465	303.2333	303.2333	(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	306.5827	271.3084	288.4240	253.7680	246.1804	222.0075	219.1064	227.6181	229.9329	256.2084	272.2465	303.2333	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		3096.6166	(64)
Electric shower(s)												3097	(64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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													
132.8362	118.1174	126.7984	114.2786	112.7524	103.7182	103.7503	106.5804	106.3534	116.0867	120.4227	131.7225	131.7225	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
184.3475	204.0991	184.3475	190.4925	184.3475	190.4925	184.3475	184.3475	190.4925	184.3475	190.4925	184.3475	184.3475	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
365.4896	369.2823	359.7249	339.3785	313.6948	289.5558	273.4294	269.6368	279.1941	299.5405	325.2242	349.3633	349.3633	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	(71)
Water heating gains (Table 5)													
178.5432	175.7700	170.4280	158.7203	151.5489	144.0531	139.4494	143.2533	147.7131	156.0305	167.2537	177.0464	177.0464	(72)
Total internal gains													

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799.2958 820.0666 785.4158 759.5066 720.5067 692.0167 665.1416 665.1529 685.3150 710.8339 753.8858 781.6725 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b	Specific data or Table 6c	FF Access factor Table 6d	Gains W
North	17.5400	10.6334	0.6300	0.7000	0.7700	56.9998 (74)
East	2.5900	19.6403	0.6300	0.7000	0.7700	15.5460 (76)
Southeast	3.3000	36.7938	0.6300	0.7000	0.7700	37.1074 (77)
South	14.7900	46.7521	0.6300	0.7000	0.7700	211.3201 (78)
Southwest	1.1000	36.7938	0.6300	0.7000	0.7700	12.3691 (79)
West	4.1100	19.6403	0.6300	0.7000	0.7700	24.6695 (80)
North	1.3600	26.0000	0.6300	0.7000	1.0000	14.0344 (82)
Solar gains	372.0464	647.1127	922.6415	1208.3732	1414.9705	1432.3211
Total gains	1171.3421	1467.1794	1708.0573	1967.8799	2135.4772	2124.3377

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
tau	74.5128	74.7361	74.9607	76.1044	76.3374	77.5238	77.5238	77.7655	77.0448	76.3374	75.8729
alpha	5.9675	5.9824	5.9974	6.0736	6.0892	6.1683	6.1683	6.1844	6.1363	6.0892	6.0582
util living area	0.9979	0.9916	0.9713	0.8927	0.7268	0.5194	0.3756	0.4240	0.6808	0.9410	0.9934
MIT	20.1488	20.3225	20.5384	20.7812	20.9096	20.9453	20.9492	20.9488	20.9293	20.7386	20.3966
Th 2	20.1404	20.1428	20.1451	20.1569	20.1593	20.1711	20.1711	20.1735	20.1664	20.1593	20.1545
util rest of house	0.9972	0.9890	0.9625	0.8644	0.6738	0.4542	0.3052	0.3485	0.6091	0.9184	0.9910
MIT 2	19.1338	19.3569	19.6297	19.9282	20.0630	20.1042	20.1063	20.1087	20.0888	19.8883	19.4621
Living area fraction	19.2326	19.4509	19.7181	20.0112	20.1454	20.1860	20.1884	20.1904	20.1706	19.9710	19.5530
MIT	19.2326	19.4509	19.7181	20.0112	20.1454	20.1860	20.1884	20.1904	20.1706	19.9710	19.5530
Temperature adjustment	19.2326	19.4509	19.7181	20.0112	20.1454	20.1860	20.1884	20.1904	20.1706	19.9710	19.5530
adjusted MIT	19.2326	19.4509	19.7181	20.0112	20.1454	20.1860	20.1884	20.1904	20.1706	19.9710	19.5530

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9961	0.9862	0.9570	0.8588	0.6729	0.4554	0.3067	0.3501	0.6095	0.9122	0.9885	0.9973
Useful gains	1166.8079	1446.9191	1634.6670	1690.1047	1436.9686	967.4517	623.9059	656.6524	1039.8567	1309.8623	1188.1313	1095.5562
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	2702.5229	2625.5741	2377.9352	1968.8689	1491.9304	971.7008	624.2018	657.3041	1062.5641	1655.4440	2213.3618	2683.8942
Space heating kWh	1142.5720	792.0562	552.9915	200.7102	40.8916	0.0000	0.0000	0.0000	0.0000	257.1128	738.1659	1181.7234
Space heating requirement - total per year (kWh/year)												4906.2237
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
Solar heating contribution - total per year (kWh/year)												0.0000
Space heating kWh	1142.5720	792.0562	552.9915	200.7102	40.8916	0.0000	0.0000	0.0000	0.0000	257.1128	738.1659	1181.7234
Space heating requirement after solar contribution - total per year (kWh/year)												4906.2237
Space heating per m2										(98c) / (4) =		25.2651

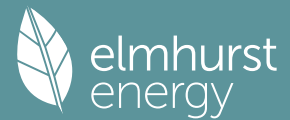
9a. Energy requirements - Individual heating systems, including micro-CHP

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 %)												249.9000 (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	1142.5720	792.0562	552.9915	200.7102	40.8916	0.0000	0.0000	0.0000	0.0000	257.1128	738.1659	1181.7234
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000
Space heating fuel (main heating system)	457.2117	316.9492	221.2851	80.3162	16.3632	0.0000	0.0000	0.0000	0.0000	102.8863	295.3845	472.8785
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
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
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
Water heating												
Water heating requirement	306.5827	271.3084	288.4240	253.7680	246.1804	222.0075	219.1064	227.6181	229.9329	256.2084	272.2465	303.2333
Efficiency of water heater (217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000
Fuel for water heating, kWh/month	175.0900	154.9449	164.7196	144.9275	140.5942	126.7890	125.1322	129.9932	131.3152	146.3212	155.4806	173.1772
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
Pumps and Fa	52.9436	47.8200	52.9436	51.2358	52.9436	51.2358	52.9436	52.9436	51.2358	52.9436	51.2358	52.9436
Lighting	40.9227	32.8297	29.5595	21.6565	16.7281	13.6670	15.2600	19.8355	25.7643	33.8042	38.1818	42.0600
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
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
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

elmhurst
energy

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		4 * 10 =	40.0000 (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) =	40.0000 / (5) =	0.0778 (8)
Pressure test			Yes

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Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Blower Door
5.0000 (17)
0.3278 (18)
2 (19)

Shelter factor

$$(20) = 1 - [0.075 \times (19)] = 0.8500 (20)$$
$$(21) = (18) \times (20) = 0.2786 (21)$$

Infiltration rate adjusted to include shelter factor

	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	0.3553	0.3483	0.3413	0.3065	0.2995	0.2647	0.2647	0.2577	0.2786	0.2995	0.3135	0.3274	(22b)
Effective ac	0.5631	0.5607	0.5583	0.5470	0.5449	0.5350	0.5350	0.5332	0.5388	0.5449	0.5491	0.5536	(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			2.3800	1.0000	2.3800			(26)
TER Opening Type			43.4300	1.1450	49.7290			(27)
TER Roof Window			1.3600	1.1450	2.1648			(27a)
FT01			83.2300	0.1300	10.8199			(28a)
WT01 Brick	104.8700	31.6200	73.2500	0.1800	13.1850			(29a)
WT03 Dormer	7.1600	2.9600	4.2000	0.1800	0.7560			(29a)
WT02 Tile hung	111.2700	11.2300	100.0400	0.1800	18.0072			(29a)
RT01 Ceiling	2.8600		2.8600	0.1100	0.3146			(30)
RT03 Flat	11.2000		11.2000	0.1100	1.2320			(30)
RT02 Rafter	97.1200	1.3600	95.7600	0.1100	10.5336			(30)
Total net area of external elements Aum(A, m2)			417.7100					(31)
Fabric heat loss, W/K = Sum (A x U)								(32)
								(26)...(30) + (32) = 109.1221

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	29.6700	0.0500	1.4835	
E3 Sill	22.4300	0.0500	1.1215	
E4 Jamb	66.0000	0.0500	3.3000	
E5 Ground floor (normal)	41.8100	0.1600	6.6896	
E6 Intermediate floor within a dwelling	32.2900	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	0.0000	0.0600	0.0000	
E13 Gable (insulation at rafter level)	13.3800	0.0800	1.0704	
E16 Corner (normal)	23.8100	0.0900	2.1429	
E17 Corner (inverted - internal area greater than external area)	2.6100	-0.0900	-0.2349	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	14.0600	0.5600	7.8736	
E24 Eaves (insulation at ceiling level - inverted)	8.7400	0.2400	2.0976	
E20 Exposed floor (normal)	0.0000	0.3200	0.0000	
R1 Head of roof window	1.5000	0.0800	0.1200	
R2 Sill of roof window	1.5000	0.0600	0.0900	
R3 Jamb of roof window	3.6000	0.0800	0.2880	
R4 Ridge (vaulted ceiling)	10.3100	0.0800	0.8248	
R7 Flat ceiling (inverted)	2.9600	0.0400	0.1184	
R9 Roof to wall (flat ceiling)	6.5800	0.0400	0.2632	

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

Point Thermal Bridges

27.2486 (36)

Total fabric heat loss

$$(33) + (36) + (36a) = 136.3707 (37)$$

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

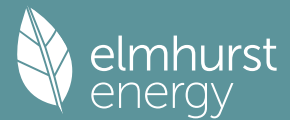
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	95.5222	95.1065	94.6990	92.7852	92.4271	90.7602	90.7602	90.4515	91.4022	92.4271	93.1515	93.9088	(38)
Heat transfer coeff	231.8929	231.4772	231.0697	229.1559	228.7978	227.1309	227.1309	226.8222	227.7729	228.7978	229.5222	230.2795	(39)
Average = Sum(39)m / 12 =													229.1541

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1942	1.1920	1.1899	1.1801	1.1782	1.1696	1.1696	1.1680	1.1729	1.1782	1.1819	1.1858	(40)
HLP (average)												1.1801	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9944 (42)	
Hot water usage for mixer showers													
74.4254	73.3069	71.6771	68.5587	66.2574	63.6910	62.2323	63.8498	65.6229	68.3784	71.5637	74.1402 (42a)		
Hot water usage for baths													
32.1286	31.6514	30.9795	29.7406	28.8129	27.7842	27.2286	27.8958	28.6223	29.7230	30.9874	32.0199 (42b)		
Hot water usage for other uses													
45.2952	43.6481	42.0010	40.3539	38.7068	37.0597	37.0597	38.7068	40.3539	42.0010	43.6481	45.2952 (42c)		
Average daily hot water use (litres/day)												139.5834 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
151.8491	148.6064	144.6576	138.6532	133.7771	128.5349	126.5206	130.4524	134.5991	140.1024	146.1993	151.4554 (44)		
Energy content (annual)	240.4919	211.6136	222.3333	189.8092	180.0897	158.0487	153.0157	161.5273	165.9741	190.1176	208.2877	237.1425 (45)	
Distribution loss (46)m = 0.15 x (45)m											Total = Sum(45)m =	2318.4512	
36.0738	31.7420	33.3500	28.4714	27.0134	23.7073	22.9524	24.2291	24.8961	28.5176	31.2432	35.5714 (46)		
Water storage loss (or HIU loss):													
Store volume												200.0000 (47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.6525 (48)	
Temperature factor from Table 2b												0.5400 (49)	
Enter (49) or (54) in (55)												0.8924 (55)	
Total storage loss													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (56)		
If cylinder contains dedicated solar storage													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (57)		
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624 (59)		

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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												
	291.4180	257.6113	273.2593	239.0925	231.0157	207.3320	203.9417	212.4534	215.2574	241.0437	257.5710	288.0686 (62)
WWHRS	-34.0242	-30.0913	-31.5098	-26.0914	-24.3162	-20.8076	-19.5038	-20.7403	-21.5283	-25.3795	-28.7519	-33.3941 (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												
	257.3938	227.5200	241.7495	213.0011	206.6995	186.5244	184.4380	191.7131	193.7291	215.6642	228.8191	254.6745 (64)
Total per year (kWh/year)											Total per year (kWh/year) = Sum(64)m =	
Electric shower(s)											2601.9263	(64)
											2602	(64)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												
Heat gains from water heating, kWh/month											0.0000	(64a)
	120.7044	107.1597	114.6667	102.5382	100.6207	91.9778	91.6186	94.4487	94.6130	103.9550	108.6823	119.5907 (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	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	184.3475	204.0991	184.3475	190.4925	184.3475	190.4925	184.3475	184.3475	190.4925	184.3475	190.4925	184.3475 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	365.4896	369.2823	359.7249	339.3785	313.6948	289.5558	273.4294	269.6368	279.1941	299.5405	325.2242	349.3633 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742 (71)
Water heating gains (Table 5)												
	162.2371	159.4638	154.1219	142.4142	135.2428	127.7470	123.1432	126.9472	131.4070	139.7244	150.9476	160.7402 (72)
Total internal gains												
	782.9896	803.7605	769.1097	743.2005	704.2006	675.7106	648.8355	648.8468	669.0089	694.5278	737.5796	765.3664 (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				
North					17.5400	10.6334	0.6300	0.7000			0.7700	56.9998 (74)				
East					2.5900	19.6403	0.6300	0.7000			0.7700	15.5460 (76)				
Southeast					3.3000	36.7938	0.6300	0.7000			0.7700	37.1074 (77)				
South					14.7900	46.7521	0.6300	0.7000			0.7700	211.3201 (78)				
Southwest					1.1000	36.7938	0.6300	0.7000			0.7700	12.3691 (79)				
West					4.1100	19.6403	0.6300	0.7000			0.7700	24.6695 (80)				
North					1.3600	26.0000	0.6300	0.7000			1.0000	14.0344 (82)				
Solar gains					372.0464	647.1127	922.6415	1208.3732	1414.9705	1432.3211	1369.3922	1210.6908	1020.6871	725.0730	448.0214	316.8662 (83)
Total gains					1155.0360	1450.8733	1691.7512	1951.5738	2119.1711	2108.0316	2018.2277	1859.5376	1689.6960	1419.6008	1185.6010	1082.2326 (84)

7. Mean internal temperature (heating season)

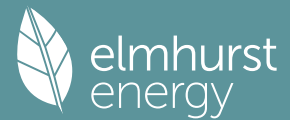
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	58.1536	58.2581	58.3608	58.8482	58.9403	59.3729	59.3729	59.4537	59.2055	58.9403	58.7543	58.5611
alpha	4.8769	4.8839	4.8907	4.9232	4.9294	4.9582	4.9582	4.9636	4.9470	4.9294	4.9170	4.9041
util living area												
	0.9981	0.9939	0.9822	0.9399	0.8330	0.6515	0.4874	0.5466	0.8004	0.9668	0.9952	0.9986 (86)
MIT	19.5106	19.7483	20.0744	20.4848	20.8009	20.9559	20.9914	20.9852	20.8795	20.4470	19.8966	19.4710 (87)
Th 2	19.9247	19.9264	19.9281	19.9360	19.9375	19.9444	19.9444	19.9457	19.9417	19.9375	19.9345	19.9313 (88)
util rest of house												
	0.9974	0.9918	0.9759	0.9188	0.7792	0.5594	0.3745	0.4286	0.7198	0.9509	0.9932	0.9981 (89)
MIT 2	18.1882	18.4928	18.9071	19.4175	19.7729	19.9199	19.9417	19.9406	19.8611	19.3832	18.6891	18.1421 (90)
Living area fraction												
	18.3169	18.6150	19.0207	19.5214	19.8730	20.0207	20.0439	20.0423	19.9602	19.4867	18.8067	18.2715 (92)
MIT												
Temperature adjustment												0.0000
adjusted MIT	18.3169	18.6150	19.0207	19.5214	19.8730	20.0207	20.0439	20.0423	19.9602	19.4867	18.8067	18.2715 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9958	0.9880	0.9686	0.9085	0.7755	0.5665	0.3854	0.4398	0.7214	0.9417	0.9899	0.9969 (94)
Useful gains	1150.2331	1433.4996	1638.5706	1772.9135	1643.3481	1194.1139	777.8396	817.8954	1218.9580	1336.8609	1173.6470	1078.9000 (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												
	3250.4160	3174.7184	2893.1580	2433.9579	1869.9579	1231.2175	782.2138	826.1455	1334.7902	2033.2686	2686.9387	3240.3670 (97)
Space heating kWh												
	1562.5361	1170.0990	933.4130	475.9519	168.5977	0.0000	0.0000	0.0000	0.0000	518.1273	1089.5701	1608.1315 (98a)
Space heating requirement - total per year (kWh/year)												
												7526.4265
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												
	1562.5361	1170.0990	933.4130	475.9519	168.5977	0.0000	0.0000	0.0000	0.0000	518.1273	1089.5701	1608.1315 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												
												7526.4265
Space heating per m ²											(98c) / (4) =	
											38.7581 (99)	

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

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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	1562.5361	1170.0990	933.4130	475.9519	168.5977	0.0000	0.0000	0.0000	0.0000	518.1273	1089.5701	1608.1315	(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)	1692.8885	1267.7129	1011.2817	515.6575	182.6627	0.0000	0.0000	0.0000	0.0000	561.3514	1180.4659	1742.2876	(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	257.3938	227.5200	241.7495	213.0011	206.6995	186.5244	184.4380	191.7131	193.7291	215.6642	228.8191	254.6745	(64)
Efficiency of water heater	87.4058	87.1990	86.7865	85.8080	83.6067	79.8000	79.8000	79.8000	79.8000	85.9510	87.0952	79.8000	(216)
Fuel for water heating, kWh/month	294.4814	260.9204	278.5567	248.2299	247.2284	233.7399	231.1253	240.2420	242.7683	250.9153	262.7230	291.2177	(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	38.3038	30.7287	27.6678	20.2706	15.6576	12.7924	14.2834	18.5661	24.1155	31.6409	35.7383	39.3684	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-72.8025	-100.1547	-140.4664	-153.8745	-162.4305	-150.1796	-148.0927	-141.3454	-129.1674	-112.3386	-79.0528	-63.2170	(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	-49.0626	-102.1811	-201.3085	-299.8979	-394.3236	-395.5871	-391.1451	-332.3815	-245.0833	-145.5642	-65.2977	-38.8962	(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												8154.3082	(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												3082.1482	(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)												309.1334	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-4113.8513	(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												7517.7386	(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	8154.3082	0.2100	1712.4047	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3082.1482	0.2100	647.2511	(264)
Space and water heating			2359.6559	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	309.1334	0.1443	44.6175	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1453.1223	0.1352	-196.3962	
PV Unit electricity exported	-2660.7289	0.1261	-335.5858	
Total			-531.9819	(269)
Total CO2, kg/year			1884.2207	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.7000	(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	8154.3082	1.1300	9214.3683	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3082.1482	1.1300	3482.8275	(278)
Space and water heating			12697.1958	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	309.1334	1.5338	474.1592	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1453.1223	1.4995	-2179.0155	
PV Unit electricity exported	-2660.7289	0.4630	-1231.8554	
Total			-3410.8709	(283)
Total Primary energy kWh/year			9890.5848	(286)
Target Primary Energy Rate (TPER)			50.9300	(287)

Summary for Input Data

Plot Reference	AT10	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	86 B	DER	10.80	TER	9.90
Environmental	89 B	% DER < TER			-9.09
CO ₂ Emissions (t/year)	1.66	DFEE	41.87	TFEE	43.57
Compliance Check	See BREL	% DFEE < TFEE			3.92
% DPER < TPER	-19.51	DPER	62.00	TPER	51.88

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	3	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	No	

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	38.84 m	74.74 m²	2.61 m
	2nd Storey:	32.18 m	62.90 m²	2.69 m
		14.32 m	38.46 m²	2.38 m

8.0 Living Area	15.64	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT03 Dormer	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		7.40	4.44	0.00	None	2.96	Enter Gross Area
	WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		206.88	170.41	0.00	None	36.47	Enter Gross Area

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	RT01 Ceiling	External Plane	Plasterboard, insulated at ceiling level	0.11	9.00	2.62	2.62	None	0.00	Enter Gross Area	0.00
	RT03 Flat	External Flat	Plasterboard, insulated flat roof	0.11	9.00	11.84	10.76	None	0.00	Enter Gross Area	1.08
	RT02 Rafter	External Slope	Plasterboard, insulated slope	0.11	9.00	93.34	91.30	None	0.00	Enter Gross Area	2.04

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	74.74

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT02 Tile hung	South East	2.10	
D002	DG Win	WT02 Tile hung	North West	5.22	
W001	DG Win	WT02 Tile hung	South East	2.72	
W002	DG Win	WT02 Tile hung	South East	2.72	
W003	DG Win	WT02 Tile hung	South West	2.72	
W004	DG Win	WT02 Tile hung	North East	1.68	
W005	DG Win	WT02 Tile hung	North East	2.39	
D003	DG Win	WT02 Tile hung	North West	2.10	
W006	DG Win	WT02 Tile hung	South East	1.48	
W008	DG Win	WT02 Tile hung	South East	1.48	
W009	DG Win	WT02 Tile hung	North West	2.17	
W007	DG Win	WT02 Tile hung	South East	1.48	
W010	DG Win	WT02 Tile hung	North West	0.82	
W011	DG Win	WT02 Tile hung	North West	2.17	
W012	DG Win	WT03 Dormer	South East	1.48	
W013	DG Win	WT03 Dormer	South East	1.48	
RL01	Roof light	RT02 Rafter	North West	0.68	0
RL02	Roof light	RT02 Rafter	North West	0.68	0
D004	DG Win	WT02 Tile hung	North West	5.22	
RL03	Roof light	RT02 Rafter	North West	0.68	0
RL04	Roof light	RT03 Flat	North West	1.08	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	Calculate Bridges
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17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	25.90	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	18.93	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	50.40	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	38.84	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	36.42	0.00	0.00 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	18.78	0.04	0.04 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	13.40	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	23.81	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	2.61	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	4.06	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	3.56	0.24	0.24 Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	0.00	0.32	0.32 Table R2	No
R1 Head of roof window	Non Gov Approved Schemes	2.25	0.08	0.08 Table R2	No
R2 Sill of roof window	Non Gov Approved Schemes	2.25	0.06	0.06 Table R2	No
R3 Jamb of roof window	Non Gov Approved Schemes	5.40	0.08	0.08 Table R2	No
R4 Ridge (vaulted ceiling)	Non Gov Approved Schemes	9.39	0.08	0.08 Table R2	No
R7 Flat ceiling (inverted)	Non Gov Approved Schemes	2.96	0.04	0.04 Table R2	No
R9 Roof to wall (flat ceiling)	Non Gov Approved Schemes	6.52	0.04	0.04 Table R2	No
E14 Flat roof	Non Gov Approved Schemes	10.19	0.08	0.08 Table R2	No

Y-value	0.05	W/m ² K
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19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)

Summary for Input Data

Duct Installation Specification	Level 1				
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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

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 Fixed Lighting	No
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Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1

Manufacturer		
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	102	
In Winter	92.50	
In Summer	92.50	
Model Name		
Manufacturer		
Controls SAP Code	2110	
Controls description	Time and temperature zone control by arrangement	
Delayed Start Stat	No	
Burner Control	Modulating	
Flue Type	Balanced	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Unknown	
Boiler Interlock	No	

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No

Summary for Input Data

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 mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

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

Recommendations

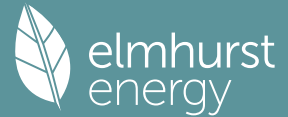
Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT10				Issued on Date	07/05/2026	
Assessment Reference	Be Lean			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	86 B		DER	10.80		TER	9.90
Environmental	89 B		% DER < TER				-9.09
CO ₂ Emissions (t/year)	1.66		DFEE	41.87		TFEE	43.57
Compliance Check	See BREL		% DFEE < TFEE				3.92
% DPER < TPER	-19.51		DPER	62.00		TPER	51.88
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	74.7400 (1b)	x 2.6100 (2b)	= 195.0714 (1b) - (3b)
First floor	62.9000 (1c)	x 2.6900 (2c)	= 169.2010 (1c) - (3c)
Second floor	38.4600 (1d)	x 2.3800 (2d)	= 91.5348 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	176.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 455.8072 (5)

2. Ventilation rate

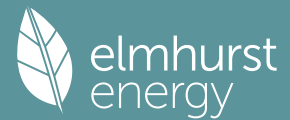
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			37.3300	1.1450	42.7443		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof light			3.1200	1.1450	3.5725		(27a)
FT01			74.7400	0.1300	9.7162		(28a)
WT03 Dormer	7.4000	2.9600	4.4400	0.1800	0.7992		(29a)
WT02 Tile hung	206.8800	36.4700	170.4100	0.1800	30.6738		(29a)
RT01 Ceiling	2.6200		2.6200	0.1100	0.2882		(30)
RT03 Flat	11.8400	1.0800	10.7600	0.1100	1.1836		(30)
RT02 Rafter	93.3400	2.0400	91.3000	0.1100	10.0430		(30)
Total net area of external elements Aum(A, m ²)			396.8200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	101.1208		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)

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List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	25.9000	0.0500	1.2950
E3 Sill	18.9300	0.0500	0.9465
E4 Jamb	50.4000	0.0500	2.5200
E5 Ground floor (normal)	38.8400	0.1600	6.2144
E6 Intermediate floor within a dwelling	36.4200	0.0000	0.0000
E11 Eaves (insulation at rafter level)	18.7800	0.0400	0.7512
E13 Gable (insulation at rafter level)	13.4000	0.0800	1.0720
E16 Corner (normal)	23.8100	0.0900	2.1429
E17 Corner (inverted - internal area greater than external area)	2.6100	-0.0900	-0.2349
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	4.0600	0.5600	2.2736
E24 Eaves (insulation at ceiling level - inverted)	3.5600	0.2400	0.8544
E20 Exposed floor (normal)	0.0000	0.3200	0.0000
R1 Head of roof window	2.2500	0.0800	0.1800
R2 Sill of roof window	2.2500	0.0600	0.1350
R3 Jamb of roof window	5.4000	0.0800	0.4320
R4 Ridge (vaulted ceiling)	9.3900	0.0800	0.7512
R7 Flat ceiling (inverted)	2.9600	0.0400	0.1184
R9 Roof to wall (flat ceiling)	6.5200	0.0400	0.2608
E14 Flat roof	10.1900	0.0800	0.8152
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			20.5277 (36)
Point Thermal bridges		(36a) =	0.0000
Total fabric heat loss		(33) + (36) + (36a) =	121.6485 (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	40.0954	39.6159	39.1365	36.7392	36.2597	33.8625	33.8625	33.3830	34.8214	36.2597	37.2187	38.1776 (38)
Average = Sum(39)m / 12 =	161.7439	161.2644	160.7850	158.3877	157.9082	155.5110	155.5110	155.0315	156.4699	157.9082	158.8671	159.8261 (39)
												158.2678
HLP	0.9185	0.9158	0.9130	0.8994	0.8967	0.8831	0.8831	0.8804	0.8885	0.8967	0.9021	0.9076 (40)
HLP (average)												0.8987
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

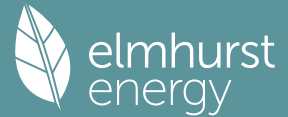
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9707 (42)
Hot water usage for mixer showers													
74.0284	72.9159	71.2947	68.1930	65.9040	63.3513	61.9003	63.5092	65.2728	68.0136	71.1820	73.7447	(42a)	
Hot water usage for baths													
31.9578	31.4832	30.8149	29.5825	28.6598	27.6366	27.0839	27.7476	28.4702	29.5651	30.8228	31.8498	(42b)	
Hot water usage for other uses													
45.0527	43.4144	41.7762	40.1379	38.4996	36.8613	36.8613	38.4996	40.1379	41.7762	43.4144	45.0527	(42c)	
Average daily hot water use (litres/day)													138.8387 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
151.0389	147.8135	143.8858	137.9134	133.0633	127.8492	125.8455	129.7564	133.8809	139.3549	145.4192	150.6473	(44)	
Energy content (annual)	239.2088	210.4845	221.1471	188.7965	179.1288	157.2055	152.1993	160.6655	165.0885	189.1032	207.1763	235.8772	(45)
Energy content (annual)										Total = Sum(45)m =		2306.0813	
Distribution loss (46)m = 0.15 x (45)m													
35.8813	31.5727	33.1721	28.3195	26.8693	23.5808	22.8299	24.0998	24.7633	28.3655	31.0765	35.3816	(46)	
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.7200 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.9288 (55)
Total storage loss													
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(56)
If cylinder contains dedicated solar storage													
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980	(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													
305.2995	270.1794	287.2378	252.7553	245.2196	221.1643	218.2900	226.7563	229.0473	255.1940	271.1351	301.9680	(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													
305.2995	270.1794	287.2378	252.7553	245.2196	221.1643	218.2900	226.7563	229.0473	255.1940	271.1351	301.9680	(64)	
12Total per year (kWh/year)													3084.2467 (64)
Electric shower(s)													3084 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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													
132.4095	117.7420	126.4040	113.9419	112.4329	103.4379	103.4789	106.2939	106.0590	115.7494	120.0532	131.3018	(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	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	175.3852	194.1765	175.3852	181.2314	175.3852	181.2314	175.3852	175.3852	181.2314	175.3852	181.2314	175.3852 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	347.7208	351.3290	342.2363	322.8791	298.4440	275.4785	260.1362	256.5279	265.6206	284.9779	309.4129	332.3784 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272 (71)
Water heating gains (Table 5)	177.9698	175.2113	169.8979	158.2526	151.1195	143.6637	139.0845	142.8681	147.3041	155.5772	166.7405	176.4809 (72)
Total internal gains												

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771.6359 791.2770 758.0796 732.9233 695.5090 667.9338 642.1661 642.3414 661.7163 686.5004 727.9450 754.8047 (73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W		
Northeast					4.0700	11.2829	0.6300	0.7000	0.7700	14.0342 (75)		
Southeast					12.8400	36.7938	0.6300	0.7000	0.7700	144.3816 (77)		
Southwest					2.7200	36.7938	0.6300	0.7000	0.7700	30.5855 (79)		
Northwest					17.7000	11.2829	0.6300	0.7000	0.7700	61.0334 (81)		
Northwest					3.1200	26.0000	0.6300	0.7000	1.0000	32.1965 (82)		
Solar gains	282.2313	517.7057	801.9634	1143.1353	1411.4379	1457.4274	1381.8353	1174.0307	919.4089	597.8569	344.8896	237.0443 (83)
Total gains	1053.8672	1308.9827	1560.0429	1876.0586	2106.9469	2125.3611	2024.0014	1816.3721	1581.1252	1284.3573	1072.8346	991.8489 (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	75.6082	75.8330	76.0591	77.2103	77.4448	78.6386	78.6386	78.8818	78.1567	77.4448	76.9773	76.5155
alpha	6.0405	6.0555	6.0706	6.1474	6.1630	6.2426	6.2426	6.2588	6.2104	6.1630	6.1318	6.1010
util living area	0.9979	0.9921	0.9693	0.8691	0.6723	0.4661	0.3378	0.3919	0.6612	0.9421	0.9938	0.9986 (86)
MIT	20.1624	20.3299	20.5580	20.8127	20.9247	20.9480	20.9500	20.9498	20.9336	20.7428	20.4033	20.1397 (87)
Th 2	20.1518	20.1541	20.1564	20.1680	20.1703	20.1819	20.1819	20.1842	20.1773	20.1703	20.1657	20.1611 (88)
util rest of house	0.9973	0.9896	0.9601	0.8377	0.6202	0.4075	0.2751	0.3228	0.5910	0.9199	0.9915	0.9981 (89)
MIT 2	19.1605	19.3757	19.6635	19.9724	20.0867	20.1169	20.1180	20.1203	20.1029	19.9032	19.4798	19.1390 (90)
Living area fraction	19.2495	19.4604	19.7429	20.0470	20.1611	20.1907	20.1919	20.1940	20.1767	19.9777	19.5618	0.0888 (91)
MIT	19.2495	19.4604	19.7429	20.0470	20.1611	20.1907	20.1919	20.1940	20.1767	19.9777	19.5618	19.2279 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2495	19.4604	19.7429	20.0470	20.1611	20.1907	20.1919	20.1940	20.1767	19.9777	19.5618	19.2279 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9963	0.9869	0.9545	0.8327	0.6196	0.4082	0.2759	0.3236	0.5909	0.9137	0.9892	0.9973 (94)
Useful gains	1049.9153	1291.8746	1489.0643	1562.1462	1305.3940	867.4736	558.4458	587.8481	934.2915	1173.4858	1061.2079	989.2033 (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	2417.9878	2348.0814	2129.2616	1765.5487	1336.0802	869.4146	558.5766	588.1907	950.8201	1480.8212	1979.7734	2401.8445 (97)
Space heating kWh	1017.8460	709.7709	476.3068	146.4498	22.8305	0.0000	0.0000	0.0000	0.0000	228.6575	661.3672	1051.0050 (98a)
Space heating requirement - total per year (kWh/year)												4314.2339
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	1017.8460	709.7709	476.3068	146.4498	22.8305	0.0000	0.0000	0.0000	0.0000	228.6575	661.3672	1051.0050 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4314.2339
Space heating per m2										(98c) / (4) =		24.4988 (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 %)												87.5000 (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	1017.8460	709.7709	476.3068	146.4498	22.8305	0.0000	0.0000	0.0000	0.0000	228.6575	661.3672	1051.0050 (98)
Space heating efficiency (main heating system 1)	87.5000	87.5000	87.5000	87.5000	87.5000	0.0000	0.0000	0.0000	0.0000	87.5000	87.5000	87.5000 (210)
Space heating fuel (main heating system)	1163.2526	811.1668	544.3506	167.3712	26.0920	0.0000	0.0000	0.0000	0.0000	261.3229	755.8482	1201.1486 (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	305.2995	270.1794	287.2378	252.7553	245.2196	221.1643	218.2900	226.7563	229.0473	255.1940	271.1351	301.9680 (64)
Efficiency of water heater	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	92.5000 (216)
Fuel for water heating, kWh/month	348.9137	308.7764	328.2718	288.8632	280.2510	252.7592	249.4743	259.1500	261.7684	291.6503	309.8687	345.1063 (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	50.4279	45.5478	50.4279	48.8012	50.4279	48.8012	50.4279	50.4279	48.8012	50.4279	48.8012	50.4279 (231)
Lighting	37.6371	30.1939	27.1862	19.9178	15.3851	12.5697	14.0348	18.2430	23.6958	31.0902	35.1163	38.6832 (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)

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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	(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											4930.5530	(211)
Space heating fuel - main system 2											0.0000	(213)
Space heating fuel - secondary											0.0000	(215)
Efficiency of water heater											92.5000	
Water heating fuel used											3524.8533	(219)
Space cooling fuel											0.0000	(221)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)												
mechanical ventilation fans (SFP = 0.9940)											552.7483	(230a)
central heating pump											41.0000	(230c)
Total electricity for the above, kWh/year											593.7483	(231)
Electricity for lighting (calculated in Appendix L)											303.7530	(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											9352.9076	(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	4930.5530	0.2100	1035.4161	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3524.8533	0.2100	740.2192	(264)
Space and water heating			1775.6353	(265)
Pumps, fans and electric keep-hot	593.7483	0.1387	82.3602	(267)
Energy for lighting	303.7530	0.1443	43.8409	(268)
Total CO2, kg/year			1901.8365	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			10.8000	(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	4930.5530	1.1300	5571.5249	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3524.8533	1.1300	3983.0842	(278)
Space and water heating			9554.6091	(279)
Pumps, fans and electric keep-hot	593.7483	1.5128	898.2224	(281)
Energy for lighting	303.7530	1.5338	465.9065	(282)
Total Primary energy kWh/year			10918.7380	(286)
Dwelling Primary energy Rate (DPER)			62.0000	(287)

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

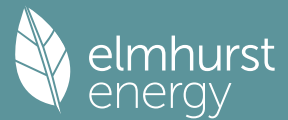
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	74.7400 (1b)	x 2.6100 (2b)	= 195.0714 (1b) - (3b)	
First floor	62.9000 (1c)	x 2.6900 (2c)	= 169.2010 (1c) - (3c)	
Second floor	38.4600 (1d)	x 2.3800 (2d)	= 91.5348 (1d) - (3d)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	176.1000			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 455.8072	(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	4 * 10 =	40.0000 (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) =	40.0000 / (5) =	0.0878 (8)
Pressure test		Yes
Pressure Test Method		Blower Door

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Measured/design AP50 5.0000 (17)
Infiltration rate 0.3378 (18)
Number of sides sheltered 2 (19)

Shelter factor (20) = $1 - [0.075 \times (19)] = 0.8500$ (20)
Infiltration rate adjusted to include shelter factor (21) = $(18) \times (20) = 0.2871$ (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000
Adj infilt rate	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750
Effective ac	0.3660	0.3589	0.3517	0.3158	0.3086	0.2727	0.2727	0.2656	0.2871	0.3086	0.3230	0.3373
	0.5670	0.5644	0.5618	0.5499	0.5476	0.5372	0.5372	0.5353	0.5412	0.5476	0.5522	0.5569

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			2.1000	1.0000	2.1000		(26)
TER Opening Type			37.3300	1.1450	42.7443		(27)
TER Roof Window			3.1200	1.1450	4.9663		(27a)
FT01			74.7400	0.1300	9.7162		(28a)
WT03 Dormer	7.4000	2.9600	4.4400	0.1800	0.7992		(29a)
WT02 Tile hung	206.8800	36.4700	170.4100	0.1800	30.6738		(29a)
RT01 Ceiling	2.6200		2.6200	0.1100	0.2882		(30)
RT03 Flat	11.8400	1.0800	10.7600	0.1100	1.1836		(30)
RT02 Rafter	93.3400	2.0400	91.3000	0.1100	10.0430		(30)
Total net area of external elements Aum(A, m2)			396.8200				(31)
Fabric heat loss, W/K = Sum (A x U)					102.5146		(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	25.9000	0.0500	1.2950
E3 Sill	18.9300	0.0500	0.9465
E4 Jamb	50.4000	0.0500	2.5200
E5 Ground floor (normal)	38.8400	0.1600	6.2144
E6 Intermediate floor within a dwelling	36.4200	0.0000	0.0000
E11 Eaves (insulation at rafter level)	18.7800	0.0400	0.7512
E13 Gable (insulation at rafter level)	13.4000	0.0800	1.0720
E16 Corner (normal)	23.8100	0.0900	2.1429
E17 Corner (inverted - internal area greater than external area)	2.6100	-0.0900	-0.2349
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	4.0600	0.5600	2.2736
E24 Eaves (insulation at ceiling level - inverted)	3.5600	0.2400	0.8544
E20 Exposed floor (normal)	0.0000	0.3200	0.0000
R1 Head of roof window	2.2500	0.0800	0.1800
R2 Sill of roof window	2.2500	0.0600	0.1350
R3 Jamb of roof window	5.4000	0.0800	0.4320
R4 Ridge (vaulted ceiling)	9.3900	0.0800	0.7512
R7 Flat ceiling (inverted)	2.9600	0.0400	0.1184
R9 Roof to wall (flat ceiling)	6.5200	0.0400	0.2608
E14 Flat roof	10.1900	0.0800	0.8152

Thermal bridges (Sum(L x Psi) calculated using Appendix K) 20.5277 (36)

Point Thermal bridges (36a) = 0.0000
Total fabric heat loss (33) + (36) + (36a) = 123.0423 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)m \times (5)$

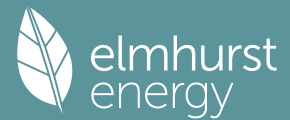
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	85.2852	84.8939	84.5103	82.7088	82.3717	80.8026	80.8026	80.5121	81.4070	82.3717	83.0536	83.7665
Average = Sum(39)m / 12 =	208.3274	207.9361	207.5526	205.7510	205.4140	203.8449	203.8449	203.5543	204.4493	205.4140	206.0959	206.8087

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.1830	1.1808	1.1786	1.1684	1.1665	1.1576	1.1576	1.1559	1.1610	1.1665	1.1703	1.1744
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												
Hot water usage for mixer showers												2.9707
Hot water usage for baths	74.0284	72.9159	71.2947	68.1930	65.9040	63.3513	61.9003	63.5092	65.2728	68.0136	71.1820	73.7447
Hot water usage for other uses	31.9578	31.4832	30.8149	29.5825	28.6598	27.6366	27.0839	27.7476	28.4702	29.5651	30.8228	31.8498
Average daily hot water use (litres/day)	45.0527	43.4144	41.7762	40.1379	38.4996	36.8613	36.8613	38.4996	40.1379	41.7762	43.4144	45.0527
Daily hot water use	151.0389	147.8135	143.8858	137.9134	133.0633	127.8492	125.8455	129.7564	133.8809	139.3549	145.4192	150.6473
Energy content (annual)	239.2088	210.4845	221.1471	188.7965	179.1288	157.2055	152.1993	160.6655	165.0885	189.1032	207.1763	235.8772
Distribution loss (46)m = $0.15 \times (45)m$	35.8813	31.5727	33.1721	28.3195	26.8693	23.5808	22.8299	24.0998	24.7633	28.3655	31.0765	35.3816
Water storage loss (or HIU loss):												200.0000
Store volume												1.6525
a) If manufacturer declared loss factor is known (kWh/day):												0.5400
Temperature factor from Table 2b												0.8924
Enter (49) or (54) in (55)												
Total storage loss	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637
If cylinder contains dedicated solar storage	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637
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
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

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Total heat required for water heating calculated for each month												
WWHRS	290.1348	256.4822	272.0731	238.0798	230.0549	206.4888	203.1254	211.5916	214.3718	240.0293	256.4596	286.8033 (62)
PV diverter	-33.8427	-29.9307	-31.3417	-25.9522	-24.1865	-20.6966	-19.3997	-20.6297	-21.4135	-25.2441	-28.5985	-33.2160 (63a)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	256.2922	226.5515	240.7314	212.1276	205.8684	185.7922	183.7256	190.9619	192.9584	214.7852	227.8611	253.5873 (64)
Total per year (kWh/year)											2591.2426 (64)	2591 (64)

12Total per year (kWh/year)												
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)	0.0000 (64a)
Heat gains from water heating, kWh/month												
	120.2778	106.7843	114.2723	102.2015	100.3012	91.6975	91.3471	94.1621	94.3186	103.6177	108.3128	119.1700 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	175.3852	194.1765	175.3852	181.2314	175.3852	181.2314	175.3852	175.3852	181.2314	175.3852	181.2314	175.3852 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	347.7208	351.3290	342.2363	322.8791	298.4440	275.4785	260.1362	256.5279	265.6206	284.9779	309.4129	332.3784 (68)
Pumps, fans	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272 (71)
Total internal gains	161.6637	158.9052	153.5917	141.9465	134.8134	127.3576	122.7784	126.5620	130.9980	139.2711	150.4344	160.1748 (72)
	755.3298	774.9708	741.7734	716.6171	679.2028	651.6277	625.8599	626.0353	645.4102	670.1943	711.6389	738.4985 (73)

6. Solar gains

[Jan]												
			Area m2		Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d	Gains W
Northeast			4.0700		11.2829		0.6300		0.7000		0.7700	14.0342 (75)
Southeast			12.8400		36.7938		0.6300		0.7000		0.7700	144.3816 (77)
Southwest			2.7200		36.7938		0.6300		0.7000		0.7700	30.5855 (79)
Northwest			17.7000		11.2829		0.6300		0.7000		0.7700	61.0334 (81)
Northwest			3.1200		26.0000		0.6300		0.7000		1.0000	32.1965 (82)
Solar gains	282.2313	517.7057	801.9634	1143.1353	1411.4379	1457.4274	1381.8353	1174.0307	919.4089	597.8569	344.8896	237.0443 (83)
Total gains	1037.5611	1292.6766	1543.7368	1859.7525	2090.6408	2109.0550	2007.6953	1800.0660	1564.8191	1268.0512	1056.5284	975.5428 (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	58.7017	58.8121	58.9208	59.4367	59.5342	59.9925	59.9925	60.0781	59.8152	59.5342	59.3373	59.1327
alpha	4.9134	4.9208	4.9281	4.9624	4.9689	4.9995	4.9995	5.0052	4.9877	4.9689	4.9558	4.9422
util living area	0.9982	0.9943	0.9815	0.9278	0.7928	0.5959	0.4423	0.5105	0.7870	0.9681	0.9955	0.9986 (86)
MIT	19.5215	19.7515	20.0951	20.5364	20.8466	20.9710	20.9946	20.9894	20.8912	20.4485	19.9005	19.4848 (87)
Th 2	19.9336	19.9354	19.9372	19.9454	19.9469	19.9541	19.9541	19.9554	19.9513	19.9469	19.9438	19.9405 (88)
util rest of house	0.9975	0.9924	0.9750	0.9037	0.7347	0.5080	0.3395	0.3995	0.7055	0.9528	0.9936	0.9982 (89)
MIT 2	18.2084	18.5034	18.9396	19.4845	19.8239	19.9386	19.9525	19.9519	19.8794	19.3926	18.7008	18.1663 (90)
Living area fraction	18.3250	18.6142	19.0423	19.5779	19.9147	20.0303	20.0450	20.0440	19.9692	19.4864	18.8073	18.2834 (91)
MIT	18.3250	18.6142	19.0423	19.5779	19.9147	20.0303	20.0450	20.0440	19.9692	19.4864	18.8073	18.2834 (92)
Temperature adjustment	18.3250	18.6142	19.0423	19.5779	19.9147	20.0303	20.0450	20.0440	19.9692	19.4864	18.8073	18.2834 (93)
adjusted MIT	18.3250	18.6142	19.0423	19.5779	19.9147	20.0303	20.0450	20.0440	19.9692	19.4864	18.8073	18.2834 (93)

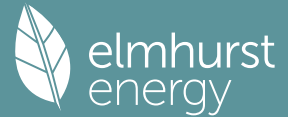
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9960	0.9888	0.9675	0.8934	0.7327	0.5147	0.3486	0.4092	0.7071	0.9436	0.9905	0.9970 (94)
Useful gains	1033.4193	1278.1414	1493.6308	1661.4931	1531.9079	1085.5284	699.8586	736.5774	1106.4535	1196.5821	1046.5396	972.6249 (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	2921.8019	2851.6825	2603.1765	2196.9993	1687.4137	1106.9292	702.2550	741.7604	1199.9627	1825.3890	2412.8313	2912.5726 (97)
Space heating kWh	1404.9567	1057.4196	825.5020	385.5644	115.6963	0.0000	0.0000	0.0000	0.0000	467.8323	983.7300	1443.3211 (98a)
Space heating requirement - total per year (kWh/year)	1404.9567	1057.4196	825.5020	385.5644	115.6963	0.0000	0.0000	0.0000	0.0000	467.8323	983.7300	1443.3211 (98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Space heating kWh	1404.9567	1057.4196	825.5020	385.5644	115.6963	0.0000	0.0000	0.0000	0.0000	467.8323	983.7300	1443.3211 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	1404.9567	1057.4196	825.5020	385.5644	115.6963	0.0000	0.0000	0.0000	0.0000	467.8323	983.7300	1443.3211 (98c)
Space heating per m2	(98c) / (4) =											37.9558 (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)

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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	1404.9567	1057.4196	825.5020	385.5644	115.6963	0.0000	0.0000	0.0000	0.0000	467.8323	983.7300	1443.3211 (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)	1522.1632	1145.6334	894.3683	417.7296	125.3481	0.0000	0.0000	0.0000	0.0000	506.8606	1065.7963	1563.7282 (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	256.2922	226.5515	240.7314	212.1276	205.8684	185.7922	183.7256	190.9619	192.9584	214.7852	227.8611	253.5873 (64)
Efficiency of water heater	87.2813	87.0674	86.5950	85.3824	82.8201	79.8000	79.8000	79.8000	79.8000	85.7568	86.9556	79.8000 (216)
Fuel for water heating, kWh/month	293.6391	260.2025	277.9969	248.4443	248.5731	232.8223	230.2326	239.3006	241.8025	250.4585	262.0430	290.3844 (219)
Space cooling fuel requirement	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	36.4416	29.2348	26.3227	19.2851	14.8964	12.1705	13.5890	17.6635	22.9431	30.1026	34.0008	37.4544 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-66.4089	-91.8833	-129.6028	-142.8232	-151.4836	-140.3338	-138.4073	-131.7632	-119.8589	-103.4863	-72.3077	-57.6041 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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)	-43.0251	-89.8130	-177.3088	-264.6615	-348.4780	-349.7612	-345.8248	-293.6405	-216.2158	-128.1088	-57.3181	-34.0929 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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												7241.6278 (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												3075.8999 (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)												294.1044 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-3694.2118 (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												7003.4203 (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	7241.6278	0.2100	1520.7418 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3075.8999	0.2100	645.9390 (264)
Space and water heating			2166.6808 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	294.1044	0.1443	42.4484 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1345.9633	0.1350	-181.7404
PV Unit electricity exported	-2348.2484	0.1261	-296.0382
Total			-477.7786 (269)
Total CO2, kg/year			1743.2798 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.9000 (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	7241.6278	1.1300	8183.0394 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3075.8999	1.1300	3475.7669 (278)
Space and water heating			11658.8063 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	294.1044	1.5338	451.1072 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1345.9633	1.4991	-2017.6783
PV Unit electricity exported	-2348.2484	0.4628	-1086.6799
Total			-3104.3582 (283)
Total Primary energy kWh/year			9135.6560 (286)
Target Primary Energy Rate (TPER)			51.8800 (287)

Summary for Input Data



Plot Reference	AT12	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	84 B	DER	12.98	TER	11.45
Environmental	88 B	% DER < TER			-13.36
CO ₂ Emissions (t/year)	1.21	DFEE	42.15	TFEE	43.51
Compliance Check	See BREL	% DFEE < TFEE			3.13
% DPER < TPER	-23.97	DPER	74.18	TPER	59.84

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements				
	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.99 m	54.22 m ²	2.61 m
		29.29 m	50.94 m ²	2.69 m

8.0 Living Area	23.89	m ²
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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
WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		83.49	63.65	0.00	None	19.84	Enter Gross Area
WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		78.79	68.64	0.00	None	10.15	Enter Gross Area

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
RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	54.22	54.22	None	0.00	Enter Gross Area	0.00

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	54.22

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Solid door	Manufacturer	Solid Door				0.63			1.00

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	South	2.10	
D002	DG Win	WT01 Brick	West	5.22	
W001	DG Win	WT01 Brick	South	1.03	
W002	DG Win	WT01 Brick	South	2.72	

Summary for Input Data

W003	DG Win	WT01 Brick	South	2.72
W004	DG Win	WT01 Brick	West	1.48
W005	DG Win	WT01 Brick	North	0.82
W006	DG Win	WT01 Brick	North	1.03
W007	DG Win	WT01 Brick	East	2.72
W008	DG Win	WT02 Tile hung	South	1.48
W009	DG Win	WT02 Tile hung	South	0.82
W010	DG Win	WT02 Tile hung	South	1.48
W011	DG Win	WT02 Tile hung	West	2.17
W012	DG Win	WT02 Tile hung	North	1.48
W013	DG Win	WT02 Tile hung	East	2.72

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	20.22	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	16.73	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	43.20	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	31.99	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	26.85	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	18.69	0.06	0.06 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	15.74	0.06	0.06 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	26.42	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	5.22	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	0.00	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	2.44	0.24	0.24 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0

Summary for Input Data

Number of flueless gas fires	0				
21.0 Fixed Cooling System	No				
22.0 Pressure Testing	Yes				
Designed AP ₅₀	3.00	m ³ /(h.m ²) @ 50 Pa			
Test Method	Blower Door				
22.0 Lighting	No				
No Fixed Lighting	No				
	Name LEL	Efficacy 85.00	Power 10.00	Capacity 850.00	Count 20
24.0 Main Heating 1	Manufacturer				
Percentage of Heat	100.00				%
Fuel Type	Mains gas				
SAP Code	102				
In Winter	92.50				
In Summer	92.50				
Model Name					
Manufacturer					
Controls SAP Code	2110				
Controls description	Time and temperature zone control by arrangement				
Delayed Start Stat	No				
Burner Control	Modulating				
Flue Type	Balanced				
Fan Assisted Flue	No				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators and Underfloor				
Underfloor Heating	Yes - Pipes in thin screed				
Flow Temperature	Unknown				
Boiler Interlock	No				
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 mains				
Bath Count	1				
28.1 Showers					
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	
28.3 Waste Water Heat Recovery System					

Summary for Input Data

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

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

Recommendations

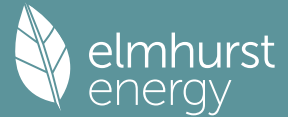
Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT12				Issued on Date	07/05/2026	
Assessment Reference	Be Lean			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	84 B	DER	12.98	TER	11.45		
Environmental	88 B	% DER < TER				-13.36	
CO ₂ Emissions (t/year)	1.21	DFEE	42.15	TFEE	43.51		
Compliance Check	See BREL	% DFEE < TFEE				3.13	
% DPER < TPER	-23.97	DPER	74.18	TPER	59.84		
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	54.2200 (1b)	x 2.6100 (2b)	= 141.5142 (1b) - (3b)
First floor	50.9400 (1c)	x 2.6900 (2c)	= 137.0286 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	105.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 278.5428 (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)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	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) =	79.2000 (23c)
Effective ac	0.2666 0.2634 0.2602 0.2442 0.2411 0.2251 0.2251 0.2219 0.2315 0.2411 0.2474 0.2538 (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							
DG Win			27.8900	1.1450	31.9351		(27)
Solid door			2.1000	1.0000	2.1000		(26)
FT01			54.2200	0.1300	7.0486		(28a)
WT01 Brick	83.4900	19.8400	63.6500	0.1800	11.4570		(29a)
WT02 Tile hung	78.7900	10.1500	68.6400	0.1800	12.3552		(29a)
RT01	54.2200		54.2200	0.1100	5.9642		(30)
Total net area of external elements Aum(A, m ²)			270.7200				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		70.8601		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)				20.2200	0.0500	1.0110	

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E3 Sill	16.7300	0.0500	0.8365
E4 Jamb	43.2000	0.0500	2.1600
E5 Ground floor (normal)	31.9900	0.1600	5.1184
E6 Intermediate floor within a dwelling	26.8500	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	18.6900	0.0600	1.1214
E12 Gable (insulation at ceiling level)	15.7400	0.0600	0.9444
E16 Corner (normal)	26.4200	0.0900	2.3778
E17 Corner (inverted - internal area greater than external area)	5.2200	-0.0900	-0.4698
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	0.0000	0.5600	0.0000
E24 Eaves (insulation at ceiling level - inverted)	2.4400	0.2400	0.5856
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			13.6853 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	84.5454 (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	24.5022	24.2092	23.9162	22.4512	22.1583	20.6933	20.6933	20.4003	21.2793	22.1583	22.7442	23.3302	(38)
Average = Sum(39)m / 12 =	109.0476	108.7546	108.4616	106.9967	106.7037	105.2387	105.2387	104.9457	105.8247	106.7037	107.2897	107.8756	(39)
												106.9234	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0370	1.0342	1.0314	1.0175	1.0147	1.0007	1.0007	0.9980	1.0063	1.0147	1.0203	1.0258	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.7824 (42)
Hot water usage for mixer showers													
	70.8721	69.8070	68.2550	65.2855	63.0941	60.6502	59.2612	60.8014	62.4898	65.1138	68.1471	70.6005	(42a)
Hot water usage for baths													
	30.6005	30.1461	29.5061	28.3261	27.4425	26.4628	25.9336	26.5691	27.2610	28.3094	29.5137	30.4971	(42b)
Hot water usage for other uses													
	43.1249	41.5567	39.9886	38.4204	36.8522	35.2840	35.2840	36.8522	38.4204	39.9886	41.5567	43.1249	(42c)
Average daily hot water use (litres/day)													132.9177 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	144.5975	141.5098	137.7497	132.0320	127.3888	122.3970	120.4788	124.2227	128.1712	133.4117	139.2175	144.2225	(44)
Energy conte	229.0072	201.5081	211.7161	180.7452	171.4898	150.5014	145.7086	153.8137	158.0480	181.0385	198.3408	225.8177	(45)
Energy content (annual)										Total = Sum(45)m =		2207.7350	
Distribution loss (46)m = 0.15 x (45)m													
	34.3511	30.2262	31.7574	27.1118	25.7235	22.5752	21.8563	23.0720	23.7072	27.1558	29.7511	33.8726	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.7200 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.9288 (55)
Total storage loss													
	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(56)
If cylinder contains dedicated solar storage													
	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980	(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													
	295.0979	261.2030	277.8069	244.7040	237.5806	214.4602	211.7994	219.9044	222.0068	247.1292	262.2996	291.9084	(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													
	295.0979	261.2030	277.8069	244.7040	237.5806	214.4602	211.7994	219.9044	222.0068	247.1292	262.2996	291.9084	(64)
12Total per year (kWh/year)													
Electric shower(s)													2985.9004 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
													0.0000 (64a)
Heat gains from water heating, kWh/month													
	129.0175	114.7574	123.2682	111.2648	109.8930	101.2088	101.3207	104.0156	103.7180	113.0679	117.1154	127.9570	(65)

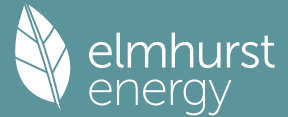
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	133.3645	147.6535	133.3645	137.8099	133.3645	137.8099	133.3645	133.3645	137.8099	133.3645	137.8099	133.3645	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	264.4099	267.1537	260.2395	245.5201	226.9395	209.4763	197.8099	195.0661	201.9803	216.6997	235.2803	252.7435	(68)
Pumps, fans	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	(69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Water heating gains (Table 5)	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	(71)
Total internal gains	173.4106	170.7699	165.6831	154.5345	147.7056	140.5677	136.1838	139.8060	144.0528	151.9730	162.6602	171.9852	(72)
	638.9215	653.3136	627.0236	605.6010	575.7461	552.5905	532.0946	532.9731	548.5795	569.7736	603.4870	625.8296	(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
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North			3.3300		10.6334		0.6300		0.7000		0.7700		10.8215 (74)
East			5.4400		19.6403		0.6300		0.7000		0.7700		32.6526 (76)
South			10.2500		46.7521		0.6300		0.7000		0.7700		146.4524 (78)
West			8.8700		19.6403		0.6300		0.7000		0.7700		53.2406 (80)

Solar gains	243.1671	428.5571	617.3829	805.3292	930.4658	933.9968	896.3685	802.9280	683.2407	482.6957	294.0445	206.2041	(83)
Total gains	882.0886	1081.8706	1244.4065	1410.9302	1506.2119	1486.5873	1428.4631	1335.9011	1231.8202	1052.4693	897.5315	832.0337	(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	66.9687	67.1491	67.3305	68.2524	68.4398	69.3925	69.3925	69.5862	69.0083	68.4398	68.0660	67.6963	
alpha	5.4646	5.4766	5.4887	5.5502	5.5627	5.6262	5.6262	5.6391	5.6006	5.5627	5.5377	5.5131	
util living area	0.9901	0.9714	0.9261	0.8087	0.6352	0.4502	0.3238	0.3606	0.5794	0.8691	0.9752	0.9926	(86)
MIT	20.2034	20.3966	20.6151	20.8237	20.9164	20.9415	20.9444	20.9442	20.9317	20.7914	20.4616	20.1721	(87)
Th 2	20.0526	20.0549	20.0573	20.0688	20.0711	20.0827	20.0827	20.0850	20.0781	20.0711	20.0665	20.0619	(88)
util rest of house	0.9871	0.9633	0.9070	0.7692	0.5794	0.3870	0.2565	0.2893	0.5075	0.8299	0.9668	0.9903	(89)
MIT 2	19.1313	19.3750	19.6421	19.8868	19.9789	20.0102	20.0118	20.0142	19.9995	19.8616	19.4687	19.0992	(90)
Living area fraction										FLA = Living area / (4) =		0.2272	(91)
MIT	19.3749	19.6071	19.8631	20.0996	20.1919	20.2218	20.2237	20.2255	20.2113	20.0728	19.6942	19.3429	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.3749	19.6071	19.8631	20.0996	20.1919	20.2218	20.2237	20.2255	20.2113	20.0728	19.6942	19.3429	(93)

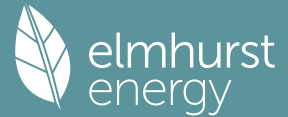
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9843	0.9587	0.9025	0.7706	0.5869	0.3966	0.2669	0.3003	0.5182	0.8300	0.9626	0.9880	(94)
Useful gains	868.2237	1037.1783	1123.0909	1087.2922	883.9551	589.6275	381.1870	401.1468	638.2814	873.5327	863.9453	822.0100	(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	1643.8804	1599.4650	1449.3868	1198.3246	906.1154	591.6290	381.3528	401.4662	646.7229	1010.7870	1351.2306	1633.5539	(97)
Space heating kWh	577.0886	377.8567	242.7641	79.9434	16.4872	0.0000	0.0000	0.0000	0.0000	102.1172	350.8454	603.7886	(98a)
Space heating requirement - total per year (kWh/year)												2350.8913	
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	577.0886	377.8567	242.7641	79.9434	16.4872	0.0000	0.0000	0.0000	0.0000	102.1172	350.8454	603.7886	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2350.8913	
Space heating per m2										(98c) / (4) =		22.3554	(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 %)													87.5000 (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	577.0886	377.8567	242.7641	79.9434	16.4872	0.0000	0.0000	0.0000	0.0000	102.1172	350.8454	603.7886	(98)
Space heating efficiency (main heating system 1)	87.5000	87.5000	87.5000	87.5000	87.5000	0.0000	0.0000	0.0000	0.0000	87.5000	87.5000	87.5000	(210)
Space heating fuel (main heating system)	659.5298	431.8362	277.4447	91.3638	18.8426	0.0000	0.0000	0.0000	0.0000	116.7054	400.9662	690.0441	(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	295.0979	261.2030	277.8069	244.7040	237.5806	214.4602	211.7994	219.9044	222.0068	247.1292	262.2996	291.9084	(64)
Efficiency of water heater (217)m	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	(216)
Fuel for water heating, kWh/month	337.2548	298.5177	317.4935	279.6617	271.5207	245.0974	242.0564	251.3193	253.7220	282.4334	299.7710	333.6096	(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	32.1706	29.0573	32.1706	31.1329	32.1706	31.1329	32.1706	32.1706	31.1329	32.1706	31.1329	32.1706	(231)
Lighting	27.1441	21.7760	19.6069	14.3648	11.0958	9.0654	10.1220	13.1569	17.0896	22.4224	25.3261	27.8985	(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												2686.7329	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												92.5000	

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Water heating fuel used	3412.4576	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)		
mechanical ventilation fans (SFP = 0.9940)	337.7833	(230a)
central heating pump	41.0000	(230c)
Total electricity for the above, kWh/year	378.7833	(231)
Electricity for lighting (calculated in Appendix L)	219.0685	(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	6697.0423	(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	2686.7329	0.2100	564.2139	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3412.4576	0.2100	716.6161	(264)
Space and water heating			1280.8300	(265)
Pumps, fans and electric keep-hot	378.7833	0.1387	52.5419	(267)
Energy for lighting	219.0685	0.1443	31.6184	(268)
Total CO2, kg/year			1364.9903	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			12.9800	(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	2686.7329	1.1300	3036.0082	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3412.4576	1.1300	3856.0771	(278)
Space and water heating			6892.0853	(279)
Pumps, fans and electric keep-hot	378.7833	1.5128	573.0234	(281)
Energy for lighting	219.0685	1.5338	336.0146	(282)
Total Primary energy kWh/year			7801.1232	(286)
Dwelling Primary energy Rate (DPER)			74.1800	(287)

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

1. Overall dwelling characteristics

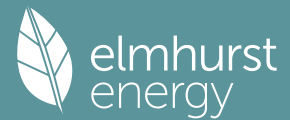
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	54.2200 (1b)	x 2.6100 (2b)	= 141.5142	(1b) - (3b)
First floor	50.9400 (1c)	x 2.6900 (2c)	= 137.0286	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	105.1600			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 278.5428	(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	4 * 10 =	40.0000 (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) =	40.0000 / (5) =	0.1436 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3936	(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) =	0.3346 (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	0.4266	0.4182	0.4098	0.3680	0.3597	0.3178	0.3178	0.3095	0.3346	0.3597	0.3764	0.3931	(22b)
Effective ac	0.5910	0.5874	0.5840	0.5677	0.5647	0.5505	0.5505	0.5479	0.5560	0.5647	0.5708	0.5773	(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			2.1000	1.0000	2.1000			(26)
TER Opening Type			24.1700	1.1450	27.6756			(27)
FT01			54.2200	0.1300	7.0486			(28a)
WT01 Brick	83.4900	17.4800	66.0100	0.1800	11.8818			(29a)
WT02 Tile hung	78.7900	8.7900	70.0000	0.1800	12.6000			(29a)
RT01	54.2200		54.2200	0.1100	5.9642			(30)
Total net area of external elements Aum(A, m2)			270.7200					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	67.2702		(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	20.2200	0.0500	1.0110	
E3 Sill	16.7300	0.0500	0.8365	
E4 Jamb	43.2000	0.0500	2.1600	
E5 Ground floor (normal)	31.9900	0.1600	5.1184	
E6 Intermediate floor within a dwelling	26.8500	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	18.6900	0.0600	1.1214	
E12 Gable (insulation at ceiling level)	15.7400	0.0600	0.9444	
E16 Corner (normal)	26.4200	0.0900	2.3778	
E17 Corner (inverted - internal area greater than external area)	5.2200	-0.0900	-0.4698	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	0.0000	0.5600	0.0000	
E24 Eaves (insulation at ceiling level - inverted)	2.4400	0.2400	0.5856	

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

13.6853 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 80.9555 (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	54.3224	53.9977	53.6794	52.1843	51.9045	50.6024	50.6024	50.3612	51.1040	51.9045	52.4704	53.0620	(38)
Heat transfer coeff	135.2779	134.9531	134.6348	133.1397	132.8600	131.5578	131.5578	131.3167	132.0594	132.8600	133.4259	134.0175	(39)
Average = Sum(39)m / 12 =												133.1384	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2864	1.2833	1.2803	1.2661	1.2634	1.2510	1.2510	1.2487	1.2558	1.2634	1.2688	1.2744	(40)
HLP (average)												1.2661	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

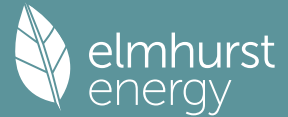
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.7824 (42)
Hot water usage for mixer showers													
70.8721	69.8070	68.2550	65.2855	63.0941	60.6502	59.2612	60.8014	62.4898	65.1138	68.1471	70.6005	(42a)	
Hot water usage for baths													
30.6005	30.1461	29.5061	28.3261	27.4425	26.4628	25.9336	26.5691	27.2610	28.3094	29.5137	30.4971	(42b)	
Hot water usage for other uses													
43.1249	41.5567	39.9886	38.4204	36.8522	35.2840	35.2840	36.8522	38.4204	39.9886	41.5567	43.1249	(42c)	
Average daily hot water use (litres/day)												132.9177	(43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
144.5975	141.5098	137.7497	132.0320	127.3888	122.3970	120.4788	124.2227	128.1712	133.4117	139.2175	144.2225	(44)	
Energy conte	229.0072	201.5081	211.7161	180.7452	171.4898	150.5014	145.7086	153.8137	158.0480	181.0385	198.3408	225.8177	(45)
Energy content (annual)										Total = Sum(45)m =			2207.7350
Distribution loss (46)m = 0.15 x (45)m													
34.3511	30.2262	31.7574	27.1118	25.7235	22.5752	21.8563	23.0720	23.7072	27.1558	29.7511	33.8726	(46)	
Water storage loss (or HIU loss):													
Store volume												200.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6525	(48)
Temperature factor from Table 2b												0.5400	(49)
Enter (49) or (54) in (55)												0.8924	(55)
Total storage loss													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)
If cylinder contains dedicated solar storage													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(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													
279.9332	247.5059	262.6422	230.0285	222.4159	199.7847	196.6347	204.7397	207.3313	231.9645	247.6241	276.7437	(62)	
WWHRS	-32.3998	-28.6546	-30.0055	-24.8457	-23.1553	-19.8142	-18.5726	-19.7501	-20.5005	-24.1678	-27.3792	-31.7998	(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													
247.5335	218.8512	232.6367	205.1828	199.2606	179.9706	178.0621	184.9896	186.8308	207.7967	220.2449	244.9440	(64)	
12Total per year (kWh/year)													
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	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													
116.8857	103.7996	111.1365	99.5244	97.7612	89.4684	89.1890	91.8839	91.9776	100.9361	105.3750	115.8252	(65)	

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

Metabolic gains (Table 5), Watts													
(66)m	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													

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Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	133.3645	147.6535	133.3645	137.8099	133.3645	137.8099	133.3645	133.3645	137.8099	133.3645	137.8099	133.3645 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	264.4099	267.1537	260.2395	245.5201	226.9395	209.4763	197.8099	195.0661	201.9803	216.6997	235.2803	252.7435 (68)
Pumps, fans	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974 (71)
Total internal gains	157.1045	154.4638	149.3770	138.2283	131.3995	124.2616	119.8776	123.4999	127.7466	135.6669	146.3541	155.6791 (72)
	622.6154	637.0075	610.7175	589.2949	559.4400	536.2844	515.7885	516.6669	532.2734	553.4675	587.1809	609.5235 (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	

North					2.8800	10.6334	0.6300	0.7000			0.7700	9.3591 (74)	
East					4.7200	19.6403	0.6300	0.7000			0.7700	28.3309 (76)	
South					8.8800	46.7521	0.6300	0.7000			0.7700	126.8778 (78)	
West					7.6900	19.6403	0.6300	0.7000			0.7700	46.1578 (80)	

Solar gains	210.7257	371.3948	535.0572	697.9636	806.4262	809.4876	776.8752	695.8869	592.1419	418.3192	254.8179	178.6923	(83)
Total gains	833.3411	1008.4023	1145.7747	1287.2585	1365.8662	1345.7720	1292.6637	1212.5539	1124.4153	971.7868	841.9988	788.2158	(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	53.9835	54.1134	54.2414	54.8505	54.9660	55.5100	55.5100	55.6119	55.2992	54.9660	54.7328	54.4912
alpha	4.5989	4.6076	4.6161	4.6567	4.6644	4.7007	4.7007	4.7075	4.6866	4.6644	4.6489	4.6327
util living area	0.9935	0.9842	0.9628	0.9017	0.7798	0.5979	0.4421	0.4886	0.7281	0.9335	0.9859	0.9950 (86)
MIT	19.5765	19.8254	20.1546	20.5505	20.8298	20.9626	20.9926	20.9884	20.9075	20.5260	19.9778	19.5375 (87)
Th 2	19.8515	19.8539	19.8563	19.8675	19.8696	19.8794	19.8794	19.8812	19.8756	19.8696	19.8654	19.8609 (88)
util rest of house	0.9914	0.9791	0.9508	0.8709	0.7179	0.5047	0.3325	0.3746	0.6386	0.9054	0.9805	0.9933 (89)
MIT 2	18.2209	18.5376	18.9506	19.4330	19.7353	19.8597	19.8773	19.8775	19.8182	19.4189	18.7417	18.1778 (90)
Living area fraction	fLA = Living area / (4) = 0.2272 (91)											
MIT	18.5288	18.8302	19.2241	19.6869	19.9839	20.1102	20.1306	20.1299	20.0657	19.6704	19.0225	18.4867 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.5288	18.8302	19.2241	19.6869	19.9839	20.1102	20.1306	20.1299	20.0657	19.6704	19.0225	18.4867 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9878	0.9729	0.9422	0.8651	0.7248	0.5247	0.3574	0.4005	0.6550	0.8993	0.9749	0.9903 (94)
Ext temp.	823.1919	981.0613	1079.5986	1113.5901	989.9742	706.1104	462.0556	485.6761	736.5228	873.8934	820.8298	780.5683 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Space heating kWh	1924.8464	1879.9216	1713.1106	1436.1608	1100.6043	724.9153	464.4843	489.7923	787.8270	1205.0945	1590.7715	1914.6662 (97)
Space heating requirement - total per year (kWh/year)	819.6310	604.0341	471.3330	232.2509	82.3088	0.0000	0.0000	0.0000	0.0000	246.4136	554.3580	843.7689 (98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	819.6310	604.0341	471.3330	232.2509	82.3088	0.0000	0.0000	0.0000	0.0000	246.4136	554.3580	843.7689 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	3854.0981											
Space heating per m2	(98c) / (4) = 36.6498 (99)											

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

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)											
Fraction of space heat from main system(s)	1.0000 (202)											
Efficiency of main space heating system 1 (in %)	92.3000 (206)											
Efficiency of main space heating system 2 (in %)	0.0000 (207)											
Efficiency of secondary/supplementary heating system, %	0.0000 (208)											
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating efficiency (main heating system 1)	819.6310	604.0341	471.3330	232.2509	82.3088	0.0000	0.0000	0.0000	0.0000	246.4136	554.3580	843.7689 (98)
Space heating fuel (main heating system)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
Space heating efficiency (main heating system 2)	888.0075	654.4248	510.6533	251.6261	89.1753	0.0000	0.0000	0.0000	0.0000	266.9703	600.6045	914.1591 (211)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	247.5335	218.8512	232.6367	205.1828	199.2606	179.9706	178.0621	184.9896	186.8308	207.7967	220.2449	244.9440 (64)
Efficiency of water heater (217)m	86.5362	86.2140	85.6093	84.3384	82.2364	79.8000	79.8000	79.8000	79.8000	84.4430	86.0409	79.8000 (216)
Fuel for water heating, kWh/month	286.0462	253.8465	271.7423	243.2852	242.3021	225.5270	223.1354	231.8166	234.1238	246.0792	255.9771	282.8370 (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)

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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	27.7105	22.2304	20.0160	14.6646	11.3273	9.2545	10.3332	13.4315	17.4461	22.8903	25.8545	28.4807	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-48.9559	-68.1336	-96.6876	-107.2630	-114.4238	-106.3109	-104.9264	-99.6075	-90.1117	-77.1476	-53.4769	-42.4240	(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	-30.4328	-63.6777	-125.9609	-188.3461	-248.2725	-249.2277	-246.3590	-209.0009	-153.6932	-90.8626	-40.5599	-24.0974	(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												4175.6209	(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												2996.7183	(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)												223.6396	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-2679.9593	(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												4802.0195	(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	4175.6209	0.2100	876.8804	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2996.7183	0.2100	629.3108	(264)
Space and water heating			1506.1912	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	223.6396	0.1443	32.2781	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1009.4687	0.1349	-136.1529	
PV Unit electricity exported	-1670.4906	0.1260	-210.5182	
Total			-346.6711	(269)
Total CO2, kg/year			1203.7275	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.4500	(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	4175.6209	1.1300	4718.4516	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2996.7183	1.1300	3386.2917	(278)
Space and water heating			8104.7433	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	223.6396	1.5338	343.0259	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1009.4687	1.4985	-1512.6832	
PV Unit electricity exported	-1670.4906	0.4626	-772.7554	
Total			-2285.4387	(283)
Total Primary energy kWh/year			6292.4314	(286)
Target Primary Energy Rate (TPER)			59.8400	(287)

Summary for Input Data

Plot Reference	AT13	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	86 B	DER	10.26	TER	9.58
Environmental	89 B	% DER < TER			-7.10
CO ₂ Emissions (t/year)	1.9	DFEE	41.94	TFEE	43.53
Compliance Check	See BREL	% DFEE < TFEE			3.66
% DPER < TPER	-17.26	DPER	59.04	TPER	50.35

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	3	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	44.35 m	86.94 m ²	2.61 m
	2nd Storey:	6.98 m	39.29 m ²	2.38 m

8.0 Living Area	18.90	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
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		115.75	82.04	0.00	None	33.71	Enter Gross Area
	WT03 Dormer	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		3.70	2.22	0.00	None	1.48	Enter Gross Area
	WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		135.94	133.62	0.00	None	2.32	Enter Gross Area

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	Openings Type
	RT01 Ceiling	External Plane	Plasterboard, insulated at ceiling level	0.11	9.00	1.08	1.08	None	0.00	Enter Gross Area	0.00
	RT02 Rafter	External Slope	Plasterboard, insulated slope	0.11	9.00	130.23	127.51	None	0.00	Enter Gross Area	2.72

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	86.94

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	East	2.10	
D002	DG Win	WT01 Brick	West	5.22	
W001	DG Win	WT01 Brick	East	2.72	
W002	DG Win	WT01 Brick	East	2.72	
W003	DG Win	WT01 Brick	South	1.50	
W004	DG Win	WT01 Brick	South	0.84	
W005	DG Win	WT01 Brick	North	1.50	
D003	DG Win	WT01 Brick	West	2.38	
W006	DG Win	WT01 Brick	North	2.17	
W008	DG Win	WT01 Brick	East	2.17	
W009	DG Win	WT01 Brick	East	1.50	
W007	DG Win	WT01 Brick	North	1.50	
W010	DG Win	WT01 Brick	East	2.17	
RL01	Roof light	RT02 Rafter	West	0.68	0
RL02	Roof light	RT02 Rafter	West	0.68	0
D004	DG Win	WT01 Brick	West	5.22	
W011	DG Win	WT02 Tile hung	North	0.82	
W012	DG Win	WT02 Tile hung	North	1.50	
W013	DG Win	WT03 Dormer	North	1.48	
RL03	Roof light	RT02 Rafter	West	0.68	0
RL04	Roof light	RT02 Rafter	West	0.68	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	Calculate Bridges
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17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted	Reference:	Imported
E1 Steel lintel with perforated steel base plate	Non Gov Approved Schemes	0.00	0.05	0.05	Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	25.01	0.05	0.05	Table R2	No
E3 Sill	Non Gov Approved Schemes	17.90	0.05	0.05	Table R2	No
E4 Jamb	Non Gov Approved Schemes	49.20	0.05	0.05	Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	44.35	0.16	0.16	Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	51.33	0.00	0.00	Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	20.83	0.04	0.04	Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	23.52	0.08	0.08	Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	37.10	0.09	0.09	Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	15.90	-0.09	-0.09	Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06	Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08	Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00	Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00	Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12	Table R2	No
E15 Flat roof with parapet	Independently assessed	0.00	0.56	0.56	Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	8.74	0.24	0.24	Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	0.00	0.32	0.32	Table R2	No
R1 Head of roof window	Non Gov Approved Schemes	3.00	0.08	0.08	Table R2	No
R2 Sill of roof window	Non Gov Approved Schemes	3.00	0.06	0.06	Table R2	No
R3 Jamb of roof window	Non Gov Approved Schemes	7.20	0.08	0.08	Table R2	No
R4 Ridge (vaulted ceiling)	Non Gov Approved Schemes	10.31	0.08	0.08	Table R2	No
R7 Flat ceiling (inverted)	Non Gov Approved Schemes	1.48	0.04	0.04	Table R2	No
R9 Roof to wall (flat ceiling)	Non Gov Approved Schemes	2.94	0.04	0.04	Table R2	No

Y-value	0.04	W/m ² K
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19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)

Summary for Input Data

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

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 Fixed Lighting	No
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Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1

Manufacturer		
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	102	
In Winter	92.50	
In Summer	92.50	
Model Name		
Manufacturer		
Controls SAP Code	2110	
Controls description	Time and temperature zone control by arrangement	
Delayed Start Stat	No	
Burner Control	Modulating	
Flue Type	Balanced	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Unknown	
Boiler Interlock	No	

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No

Summary for Input Data

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 mains
Bath Count	1

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Cylinder Volume	200.00
Loss	1.72
Pipes insulation	All accessible pipework insulated

L

kWh/day

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

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

Recommendations

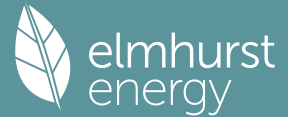
Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT13				Issued on Date	07/05/2026	
Assessment Reference	Be Lean			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	86 B	DER	10.26	TER	9.58		
Environmental	89 B	% DER < TER				-7.10	
CO ₂ Emissions (t/year)	1.9	DFEE	41.94	TFEE	43.53		
Compliance Check	See BREL	% DFEE < TFEE				3.66	
% DPER < TPER	-17.26	DPER	59.04	TPER	50.35		
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	86.9400 (1b)	x 2.6100 (2b)	= 226.9134 (1b) - (3b)
First floor	86.9400 (1c)	x 2.6900 (2c)	= 233.8686 (1c) - (3c)
Second floor	39.2900 (1d)	x 2.3800 (2d)	= 93.5102 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	213.1700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 554.2922 (5)

2. Ventilation rate

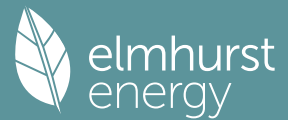
	m ³ per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			35.4100	1.1450	40.5458		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof light			2.7200	1.1450	3.1145		(27a)
FT01			86.9400	0.1300	11.3022		(28a)
WT01 Brick	115.7500	33.7100	82.0400	0.1800	14.7672		(29a)
WT03 Dormer	3.7000	1.4800	2.2200	0.1800	0.3996		(29a)
WT02 Tile hung	135.9400	2.3200	133.6200	0.1800	24.0516		(29a)
RT01 Ceiling	1.0800		1.0800	0.1100	0.1188		(30)
RT02 Rafter	130.2300	2.7200	127.5100	0.1100	14.0261		(30)
Total net area of external elements Aum(A, m ²)			473.6400				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		110.4258		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)

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List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	25.0100	0.0500	1.2505
E3 Sill	17.9000	0.0500	0.8950
E4 Jamb	49.2000	0.0500	2.4600
E5 Ground floor (normal)	44.3500	0.1600	7.0960
E6 Intermediate floor within a dwelling	51.3300	0.0000	0.0000
E11 Eaves (insulation at rafter level)	20.8300	0.0400	0.8332
E13 Gable (insulation at rafter level)	23.5200	0.0800	1.8816
E16 Corner (normal)	37.1000	0.0900	3.3390
E17 Corner (inverted - internal area greater than external area)	15.9000	-0.0900	-1.4310
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	0.0000	0.5600	0.0000
E24 Eaves (insulation at ceiling level - inverted)	8.7400	0.2400	2.0976
E20 Exposed floor (normal)	0.0000	0.3200	0.0000
R1 Head of roof window	3.0000	0.0800	0.2400
R2 Sill of roof window	3.0000	0.0600	0.1800
R3 Jamb of roof window	7.2000	0.0800	0.5760
R4 Ridge (vaulted ceiling)	10.3100	0.0800	0.8248
R7 Flat ceiling (inverted)	1.4800	0.0400	0.0592
R9 Roof to wall (flat ceiling)	2.9400	0.0400	0.1176
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			20.4195 (36)
Point Thermal Bridges			0.0000 (36a)
Total fabric heat loss		(33) + (36) + (36a) =	130.8453 (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	48.7587	48.1756	47.5926	44.6773	44.0943	41.1791	41.1791	40.5960	42.3452	44.0943	45.2604	46.4265 (38)
Average = Sum(39)m / 12 =	179.6040	179.0209	178.4379	175.5226	174.9396	172.0244	172.0244	171.4413	173.1905	174.9396	176.1057	177.2718 (39)
												175.3769
HLP	0.8425	0.8398	0.8371	0.8234	0.8207	0.8070	0.8070	0.8042	0.8125	0.8207	0.8261	0.8316 (40)
HLP (average)												0.8227
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

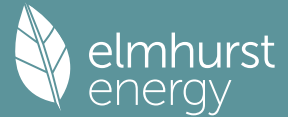
4. Water heating energy requirements (kWh/year)

Assumed occupancy												3.0190 (42)
Hot water usage for mixer showers	74.8394	73.7147	72.0758	68.9401	66.6260	64.0453	62.5785	64.2050	65.9879	68.7588	71.9618	74.5527 (42a)
Hot water usage for baths	32.3066	31.8268	31.1512	29.9054	28.9725	27.9382	27.3795	28.0504	28.7809	29.8877	31.1592	32.1974 (42b)
Hot water usage for other uses	45.5481	43.8918	42.2355	40.5792	38.9229	37.2666	37.2666	38.9229	40.5792	42.2355	43.8918	45.5481 (42c)
Average daily hot water use (litres/day)												140.3601 (43)
Daily hot water use	152.6941	149.4333	145.4625	139.4247	134.5214	129.2501	127.2246	131.1783	135.3480	140.8820	147.0128	152.2981 (44)
Energy conte	241.8301	212.7910	223.5704	190.8654	181.0917	158.9281	153.8671	162.4261	166.8977	191.1755	209.4467	238.4621 (45)
Energy content (annual)										Total = Sum(45)m =		2331.3519
Distribution loss (46)m = 0.15 x (45)m	36.2745	31.9187	33.5356	28.6298	27.1638	23.8392	23.0801	24.3639	25.0347	28.6763	31.4170	35.7693 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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	307.9209	272.4859	289.6612	254.8242	247.1825	222.8869	219.9579	228.5169	230.8565	257.2663	273.4055	304.5528 (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	307.9209	272.4859	289.6612	254.8242	247.1825	222.8869	219.9579	228.5169	230.8565	257.2663	273.4055	304.5528 (64)
Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		3109.5173 (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	133.2811	118.5089	127.2098	114.6298	113.0856	104.0106	104.0334	106.8793	106.6605	116.4385	120.8081	132.1612 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	197.2531	218.3873	197.2531	203.8282	197.2531	203.8282	197.2531	197.2531	203.8282	197.2531	203.8282	197.2531 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	383.3962	387.3746	377.3490	356.0058	329.0638	303.7421	286.8256	282.8471	292.8727	314.2160	341.1580	366.4797 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952 (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)	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620 (71)
Water heating gains (Table 5)	179.1413	176.3526	170.9809	159.2080	151.9968	144.4592	139.8299	143.6550	148.1396	156.5033	167.7890	177.6361 (72)
Total internal gains	831.0763	853.4003	816.8687	790.3277	749.5994	720.3152	692.1943	692.0409	713.1263	739.2581	784.0609	812.6546 (73)

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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
North													8.9700	10.6334	0.6300	0.7000	0.7700	29.1498 (74)
East													11.2800	19.6403	0.6300	0.7000	0.7700	67.7062 (76)
South													2.3400	46.7521	0.6300	0.7000	0.7700	33.4340 (78)
West													12.8200	19.6403	0.6300	0.7000	0.7700	76.9497 (80)
West													2.7200	26.0000	0.6300	0.7000	1.0000	28.0688 (82)
Solar gains	235.3085	451.7374	734.0717	1072.4831	1327.2059	1366.9194	1297.7834	1104.2342	852.8287	532.3998	291.5854	194.8197	(83)					
Total gains	1066.3848	1305.1377	1550.9405	1862.8109	2076.8052	2087.2346	1989.9777	1796.2752	1565.9549	1271.6579	1075.6463	1007.4743	(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	82.4229	82.6913	82.9615	84.3394	84.6205	86.0545	86.0545	86.3472	85.4751	84.6205	84.0602	83.5072
alpha	6.4949	6.5128	6.5308	6.6226	6.6414	6.7370	6.7370	6.7565	6.6983	6.6414	6.6040	6.5671
util living area	0.9992	0.9968	0.9855	0.9184	0.7437	0.5241	0.3800	0.4381	0.7293	0.9702	0.9975	0.9995 (86)
MIT	20.1795	20.3202	20.5289	20.7875	20.9201	20.9510	20.9536	20.9533	20.9323	20.7182	20.4019	20.1635 (87)
Th 2	20.2166	20.2190	20.2213	20.2331	20.2355	20.2473	20.2473	20.2497	20.2426	20.2355	20.2307	20.2260 (88)
util rest of house	0.9990	0.9958	0.9808	0.8955	0.6944	0.4640	0.3152	0.3672	0.6621	0.9572	0.9966	0.9993 (89)
MIT 2	19.2358	19.4177	19.6844	20.0077	20.1492	20.1865	20.1880	20.1904	20.1691	19.9343	19.5324	19.2230 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.3195	19.4977	19.7593	20.0768	20.2175	20.2543	20.2559	20.2580	20.2368	20.0038	19.6095	19.3064 (92)
Temperature adjustment												
adjusted MIT	19.3195	19.4977	19.7593	20.0768	20.2175	20.2543	20.2559	20.2580	20.2368	20.0038	19.6095	19.3064 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9985	0.9945	0.9772	0.8902	0.6932	0.4646	0.3159	0.3679	0.6616	0.9523	0.9955	0.9990 (94)
Useful gains	1064.8286	1297.9980	1515.5917	1658.2373	1439.6546	969.6408	628.7156	660.9342	1036.0096	1210.9625	1070.7883	1006.4502 (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	2697.5585	2613.3003	2365.9575	1961.7874	1490.0508	972.6795	628.8990	661.4236	1062.8312	1645.0986	2202.9950	2677.9332 (97)
Space heating kWh	1214.7511	883.8831	632.6722	218.5561	37.4948	0.0000	0.0000	0.0000	0.0000	322.9972	815.1888	1243.5834 (98a)
Space heating requirement - total per year (kWh/year)												
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)												
Space heating kWh	1214.7511	883.8831	632.6722	218.5561	37.4948	0.0000	0.0000	0.0000	0.0000	322.9972	815.1888	1243.5834 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												
Space heating per m ²	(98c) / (4) =											

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 %)												87.5000 (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	1214.7511	883.8831	632.6722	218.5561	37.4948	0.0000	0.0000	0.0000	0.0000	322.9972	815.1888	1243.5834 (98)
Space heating efficiency (main heating system 1)	87.5000	87.5000	87.5000	87.5000	87.5000	0.0000	0.0000	0.0000	0.0000	87.5000	87.5000	87.5000 (210)
Space heating fuel (main heating system)	1388.2869	1010.1522	723.0539	249.7784	42.8512	0.0000	0.0000	0.0000	0.0000	369.1397	931.6444	1421.2381 (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	307.9209	272.4859	289.6612	254.8242	247.1825	222.8869	219.9579	228.5169	230.8565	257.2663	273.4055	304.5528 (64)
Efficiency of water heater	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000 (216)
Fuel for water heating, kWh/month	351.9096	311.4125	331.0413	291.2276	282.4943	254.7279	251.3804	261.1622	263.8360	294.0186	312.4634	348.0604 (219)
Space cooling fuel requirement	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	60.5714	54.7096	60.5714	58.6175	60.5714	58.6175	60.5714	60.5714	58.6175	60.5714	58.6175	60.5714 (231)
Lighting	45.0509	36.1415	32.5414	23.8412	18.4157	15.0457	16.7994	21.8365	28.3634	37.2143	42.0335	46.3030 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)												

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(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												6136.1447	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												92.5000	
Water heating fuel used												3553.7341	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)													
mechanical ventilation fans (SFP = 0.9940)												672.1791	(230a)
central heating pump												41.0000	(230c)
Total electricity for the above, kWh/year												713.1791	(231)
Electricity for lighting (calculated in Appendix L)												363.5865	(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												10766.6443	(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	6136.1447	0.2100	1288.5904	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3553.7341	0.2100	746.2842	(264)
Space and water heating			2034.8745	(265)
Pumps, fans and electric keep-hot	713.1791	0.1387	98.9267	(267)
Energy for lighting	363.5865	0.1443	52.4768	(268)
Total CO2, kg/year			2186.2780	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			10.2600	(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	6136.1447	1.1300	6933.8435	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3553.7341	1.1300	4015.7195	(278)
Space and water heating			10949.5630	(279)
Pumps, fans and electric keep-hot	713.1791	1.5128	1078.8973	(281)
Energy for lighting	363.5865	1.5338	557.6811	(282)
Total Primary energy kWh/year			12586.1414	(286)
Dwelling Primary energy Rate (DPER)			59.0400	(287)

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

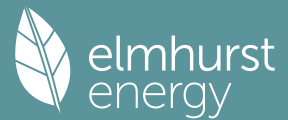
1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	86.9400 (1b)	x	2.6100 (2b)	=	226.9134 (1b) - (3b)	
First floor	86.9400 (1c)	x	2.6900 (2c)	=	233.8686 (1c) - (3c)	
Second floor	39.2900 (1d)	x	2.3800 (2d)	=	93.5102 (1d) - (3d)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	213.1700					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	554.2922	(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	4 * 10 =	40.0000	(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) =	40.0000 / (5) =	0.0722 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)

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Infiltration rate 0.3222 (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) = 0.2738 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate													
Effective ac	0.3491	0.3423	0.3355	0.3012	0.2944	0.2601	0.2601	0.2533	0.2738	0.2944	0.3081	0.3218	(22b)
	0.5610	0.5586	0.5563	0.5454	0.5433	0.5338	0.5338	0.5321	0.5375	0.5433	0.5475	0.5518	(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			2.1000	1.0000	2.1000			(26)
TER Opening Type			35.4100	1.1450	40.5458			(27)
TER Roof Window			2.7200	1.1450	4.3296			(27a)
FT01			86.9400	0.1300	11.3022			(28a)
WT01 Brick	115.7500	33.7100	82.0400	0.1800	14.7672			(29a)
WT03 Dormer	3.7000	1.4800	2.2200	0.1800	0.3996			(29a)
WT02 Tile hung	135.9400	2.3200	133.6200	0.1800	24.0516			(29a)
RT01 Ceiling	1.0800		1.0800	0.1100	0.1188			(30)
RT02 Rafter	130.2300	2.7200	127.5100	0.1100	14.0261			(30)
Total net area of external elements Aum (A, m2)			473.6400					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	111.6409		(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	25.0100	0.0500	1.2505	
E3 Sill	17.9000	0.0500	0.8950	
E4 Jamb	49.2000	0.0500	2.4600	
E5 Ground floor (normal)	44.3500	0.1600	7.0960	
E6 Intermediate floor within a dwelling	51.3300	0.0000	0.0000	
E11 Eaves (insulation at rafter level)	20.8300	0.0400	0.8332	
E13 Gable (insulation at rafter level)	23.5200	0.0800	1.8816	
E16 Corner (normal)	37.1000	0.0900	3.3390	
E17 Corner (inverted - internal area greater than external area)	15.9000	-0.0900	-1.4310	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	0.0000	0.5600	0.0000	
E24 Eaves (insulation at ceiling level - inverted)	8.7400	0.2400	2.0976	
E20 Exposed floor (normal)	0.0000	0.3200	0.0000	
R1 Head of roof window	3.0000	0.0800	0.2400	
R2 Sill of roof window	3.0000	0.0600	0.1800	
R3 Jamb of roof window	7.2000	0.0800	0.5760	
R4 Ridge (vaulted ceiling)	10.3100	0.0800	0.8248	
R7 Flat ceiling (inverted)	1.4800	0.0400	0.0592	
R9 Roof to wall (flat ceiling)	2.9400	0.0400	0.1176	

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

20.4195 (36)

Point Thermal bridges

Total fabric heat loss (33) + (36) + (36a) = 132.0604 (37)

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

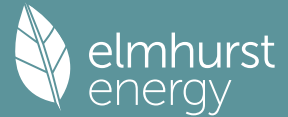
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	102.6072	102.1743	101.7499	99.7567	99.3838	97.6478	97.6478	97.3263	98.3165	99.3838	100.1382	100.9269	(38)
Heat transfer coeff	234.6676	234.2347	233.8103	231.8171	231.4442	229.7082	229.7082	229.3867	230.3769	231.4442	232.1986	232.9873	(39)
Average = Sum(39)m / 12 =												231.8153	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.1008	1.0988	1.0968	1.0875	1.0857	1.0776	1.0776	1.0761	1.0807	1.0857	1.0893	1.0930	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													3.0190 (42)
Hot water usage for mixer showers													
	74.8394	73.7147	72.0758	68.9401	66.6260	64.0453	62.5785	64.2050	65.9879	68.7588	71.9618	74.5527	(42a)
Hot water usage for baths													
	32.3066	31.8268	31.1512	29.9054	28.9725	27.9382	27.3795	28.0504	28.7809	29.8877	31.1592	32.1974	(42b)
Hot water usage for other uses													
	45.5481	43.8918	42.2355	40.5792	38.9229	37.2666	37.2666	38.9229	40.5792	42.2355	43.8918	45.5481	(42c)
Average daily hot water use (litres/day)													140.3601 (43)
Daily hot water use													
	152.6941	149.4333	145.4625	139.4247	134.5214	129.2501	127.2246	131.1783	135.3480	140.8820	147.0128	152.2981	(44)
Energy conte	241.8301	212.7910	223.5704	190.8654	181.0917	158.9281	153.8671	162.4261	166.8977	191.1755	209.4467	238.4621	(45)
Energy content (annual)										Total = Sum(45)m =		2331.3519	
Distribution loss (46)m = 0.15 x (45)m													
	36.2745	31.9187	33.5356	28.6298	27.1638	23.8392	23.0801	24.3639	25.0347	28.6763	31.4170	35.7693	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6525 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8924 (55)
Total storage loss													
	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)
If cylinder contains dedicated solar storage													
	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(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													
	292.7562	258.7888	274.4965	240.1487	232.0178	208.2114	204.7932	213.3522	216.1810	242.1016	258.7300	289.3881	(62)

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WVHRS	-34.2134	-30.2587	-31.6851	-26.2365	-24.4515	-20.9233	-19.6123	-20.8557	-21.6481	-25.5207	-28.9119	-33.5799 (63a)
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
Output from w/h	258.5427	228.5301	242.8113	213.9121	207.5663	187.2881	185.1809	192.4965	194.5329	216.5809	229.8181	255.8083 (64)
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =											2613.0683 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	121.1494	107.5512	115.0780	102.8894	100.9539	92.2702	91.9017	94.7475	94.9201	104.3067	109.0677	120.0295 (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	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	197.2531	218.3873	197.2531	203.8282	197.2531	203.8282	197.2531	197.2531	203.8282	197.2531	203.8282	197.2531	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	383.3962	387.3746	377.3490	356.0058	329.0638	303.7421	286.8256	282.8471	292.8727	314.2160	341.1580	366.4797	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	(71)
Water heating gains (Table 5)	162.8352	160.0465	154.6747	142.9019	135.6907	128.1531	123.5237	127.3488	131.8335	140.1972	151.4829	161.3300	(72)
Total internal gains	814.7702	837.0942	800.5626	774.0216	733.2932	704.0091	675.8882	675.7348	696.8201	722.9520	767.7548	796.3485	(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	
North					8.9700	10.6334	0.6300		0.7000		0.7700	29.1498 (74)	
East					11.2800	19.6403	0.6300		0.7000		0.7700	67.7062 (76)	
South					2.3400	46.7521	0.6300		0.7000		0.7700	33.4340 (78)	
West					12.8200	19.6403	0.6300		0.7000		0.7700	76.9497 (80)	
West					2.7200	26.0000	0.6300		0.7000		1.0000	28.0688 (82)	
Solar gains	235.3085	451.7374	734.0717	1072.4831	1327.2059	1366.9194	1297.7834	1104.2342	852.8287	532.3998	291.5854	194.8197 (83)	
Total gains	1050.0787	1288.8316	1534.6343	1846.5047	2060.4991	2070.9285	1973.6716	1779.9690	1549.6488	1255.3518	1059.3402	991.1682 (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	63.0827	63.1993	63.3140	63.8584	63.9614	64.4447	64.4447	64.5350	64.2576	63.9613	63.7535	63.5377
alpha	5.2055	5.2133	5.2209	5.2572	5.2641	5.2963	5.2963	5.3023	5.2838	5.2641	5.2502	5.2358
util living area	0.9992	0.9976	0.9912	0.9591	0.8581	0.6720	0.5048	0.5771	0.8514	0.9842	0.9981	0.9994 (86)
MIT	19.5439	19.7384	20.0509	20.4740	20.8045	20.9600	20.9926	20.9858	20.8623	20.4039	19.8964	19.5144 (87)
Th 2	20.0001	20.0018	20.0034	20.0111	20.0125	20.0192	20.0192	20.0204	20.0166	20.0125	20.0096	20.0066 (88)
util rest of house	0.9990	0.9967	0.9880	0.9438	0.8102	0.5842	0.3961	0.4622	0.7824	0.9760	0.9972	0.9992 (89)
MIT 2	18.2843	18.5345	18.9341	19.4674	19.8464	19.9963	20.0168	20.0153	19.9182	19.3901	18.7430	18.2511 (90)
Living area fraction	18.3959	18.6412	19.0331	19.5566	19.9313	20.0818	20.1033	20.1013	20.0019	19.4800	18.8453	0.0887 (91)
MIT	18.3959	18.6412	19.0331	19.5566	19.9313	20.0818	20.1033	20.1013	20.0019	19.4800	18.8453	18.3631 (92)
Temperature adjustment	18.3959	18.6412	19.0331	19.5566	19.9313	20.0818	20.1033	20.1013	20.0019	19.4800	18.8453	0.0000 (93)
adjusted MIT	18.3959	18.6412	19.0331	19.5566	19.9313	20.0818	20.1033	20.1013	20.0019	19.4800	18.8453	18.3631 (93)

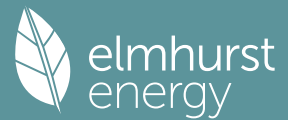
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9983	0.9949	0.9834	0.9348	0.8057	0.5902	0.4056	0.4720	0.7812	0.9696	0.9957	0.9987 (94)
Useful gains	1048.2520	1282.2650	1509.2208	1726.0688	1660.0852	1222.1976	800.6147	840.1879	1210.6291	1217.1405	1054.8065	989.8907 (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	3307.8609	3218.6632	2930.3784	2470.3829	1905.0870	1259.2097	804.7468	849.0374	1359.6685	2055.2168	2727.2355	3299.8142 (97)
Space heating kWh	1681.1491	1301.2596	1057.3412	535.9061	182.2813	0.0000	0.0000	0.0000	0.0000	623.5287	1204.1489	1718.5831 (98a)
Space heating requirement - total per year (kWh/year)												8304.1981
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	1681.1491	1301.2596	1057.3412	535.9061	182.2813	0.0000	0.0000	0.0000	0.0000	623.5287	1204.1489	1718.5831 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												8304.1981
Space heating per m2											(98c) / (4) =	38.9558 (99)

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

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)
Efficiency of main space heating system 1 (in %)	1.0000 (202)
Efficiency of main space heating system 2 (in %)	92.3000 (206)
Efficiency of secondary/supplementary heating system, %	0.0000 (207)
	0.0000 (208)

Full SAP Calculation Printout



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1681.1491	1301.2596	1057.3412	535.9061	182.2813	0.0000	0.0000	0.0000	0.0000	623.5287	1204.1489	1718.5831	(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)	1821.3966	1409.8154	1145.5484	580.6134	197.4879	0.0000	0.0000	0.0000	0.0000	675.5458	1304.6033	1861.9535	(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 requirement	258.5427	228.5301	242.8113	213.9121	207.5663	187.2881	185.1809	192.4965	194.5329	216.5809	229.8181	255.8083	(64)
Efficiency of water heater	87.4849	87.3287	86.9682	86.0319	83.7698	79.8000	79.8000	79.8000	79.8000	86.2911	87.2234	87.5211	(216)
Fuel for water heating, kWh/month	295.5286	261.6897	279.1955	248.6428	247.7819	234.6968	232.0562	241.2237	243.7755	250.9888	263.4821	292.2818	(217)
Space cooling fuel requirement	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)
(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	7.0685	7.3041	7.0685	7.3041	7.0685	(231)
Lighting	40.9853	32.8799	29.6047	21.6897	16.7537	13.6880	15.2833	19.8658	25.8038	33.8559	38.2402	42.1244	(232)
Electricity generated by PVs (Appendix M) (negative quantity)	-76.1152	-104.7391	-146.9191	-160.9521	-169.8884	-157.0522	-154.8638	-147.8205	-135.0993	-117.4886	-82.6583	-66.0898	(233a)
(233a)m	-76.1152	-104.7391	-146.9191	-160.9521	-169.8884	-157.0522	-154.8638	-147.8205	-135.0993	-117.4886	-82.6583	-66.0898	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)
(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)	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)
(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)	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)
(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)	-51.1821	-106.6159	-210.0904	-313.0474	-411.6833	-413.0423	-408.4107	-347.0229	-255.8338	-151.9103	-68.1266	-40.5752	(233b)
(233b)m	-51.1821	-106.6159	-210.0904	-313.0474	-411.6833	-413.0423	-408.4107	-347.0229	-255.8338	-151.9103	-68.1266	-40.5752	(233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)
(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)	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)
(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)	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)
(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												8996.9643	(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												3091.3434	(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)												330.7748	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-4297.2273	(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												8207.8552	(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	8996.9643	0.2100	1889.3625 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3091.3434	0.2100	649.1821 (264)
Space and water heating			2538.5446 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	330.7748	0.1443	47.7410 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1519.6864	0.1352	-205.3917 (236)
PV Unit electricity exported	-2777.5410	0.1261	-350.2994 (237)
Total			-555.6911 (269)
Total CO2, kg/year			2042.5238 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.5800 (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	8996.9643	1.1300	10166.5697 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3091.3434	1.1300	3493.2181 (278)
Space and water heating			13659.7878 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	330.7748	1.5338	507.3534 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1519.6864	1.4995	-2278.8277 (283)
PV Unit electricity exported	-2777.5410	0.4630	-1285.8645 (286)
Total			-3564.6923 (287)
Total Primary energy kWh/year			10732.5497 (288)
Target Primary Energy Rate (TPER)			50.3500 (289)

Summary for Input Data



Plot Reference	AT14	Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	84 B	DER	13.34	TER	11.65
Environmental	89 B	% DER < TER			-14.51
CO ₂ Emissions (t/year)	0.96	DFEE	36.09	TFEE	37.41
Compliance Check	See BREL	% DFEE < TFEE			3.53
% DPER < TPER	-25.51	DPER	76.27	TPER	60.77

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Semi-Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	22.33 m	39.49 m²	2.41 m
		22.33 m	39.49 m²	2.66 m

8.0 Living Area	13.92	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		113.21	88.78	0.00	None	24.43	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
	Party Wall 1	Solid Wall	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00		22.36	0.00	None

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	39.49	39.49	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	39.49

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT02 Tile hung	North	2.10	
D002	DG Win	WT02 Tile hung	South	5.22	
D003	DG Win	WT02 Tile hung	South	5.22	
W001	DG Win	WT02 Tile hung	North	1.50	
W002	DG Win	WT02 Tile hung	North	1.50	
W003	DG Win	WT02 Tile hung	North	1.50	
W004	DG Win	WT02 Tile hung	North West	0.82	
W005	DG Win	WT02 Tile hung	North	1.50	
W006	DG Win	WT02 Tile hung	South	2.12	
W007	DG Win	WT02 Tile hung	South	0.78	
W008	DG Win	WT02 Tile hung	South	2.17	

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	15.92	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	9.95	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	31.80	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	22.33	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	22.33	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	17.92	0.06	0.06 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.24	0.24 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	4.41	0.06	0.06 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	10.14	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	0.00	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	10.14	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	4.41	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	4.41	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	4.41	0.12	0.12 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0

Summary for Input Data

Number of flueless gas fires	0				
21.0 Fixed Cooling System	No				
22.0 Pressure Testing	Yes				
Designed AP ₅₀	3.00	m ³ /(h.m ²) @ 50 Pa			
Test Method	Blower Door				
22.0 Lighting	No				
No Fixed Lighting	No				
	Name LEL	Efficacy 85.00	Power 10.00	Capacity 850.00	Count 20
24.0 Main Heating 1	Manufacturer				
Percentage of Heat	100.00				%
Fuel Type	Mains gas				
SAP Code	102				
In Winter	92.50				
In Summer	92.50				
Model Name					
Manufacturer					
Controls SAP Code	2110				
Controls description	Time and temperature zone control by arrangement				
Delayed Start Stat	No				
Burner Control	Modulating				
Flue Type	Balanced				
Fan Assisted Flue	No				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators and Underfloor				
Underfloor Heating	Yes - Pipes in thin screed				
Flow Temperature	Unknown				
Boiler Interlock	No				
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 mains				
Bath Count	1				
28.1 Showers					
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	
28.3 Waste Water Heat Recovery System					

Summary for Input Data

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

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

Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT14			Issued on Date	07/05/2026
Assessment Reference	Be Lean	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	84 B	DER	13.34	TER	11.65
Environmental	89 B	% DER < TER			-14.51
CO ₂ Emissions (t/year)	0.96	DFEE	36.09	TFEE	37.41
Compliance Check	See BREL	% DFEE < TFEE			3.53
% DPER < TPER	-25.51	DPER	76.27	TPER	60.77
Assessor Details	Mr. Giles Murgatroyd			Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC				

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	39.4900 (1b)	x 2.4100 (2b)	= 95.1709 (1b) - (3b)
First floor	39.4900 (1c)	x 2.6600 (2c)	= 105.0434 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	78.9800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 200.2143 (5)

2. Ventilation rate

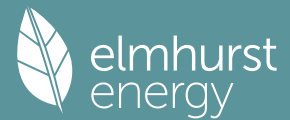
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			22.3300	1.1450	25.5687		(27)
Solid door			2.1000	1.0000	2.1000		(26)
FT01			39.4900	0.1300	5.1337		(28a)
WT02 Tile hung	113.2100	24.4300	88.7800	0.1800	15.9804		(29a)
RT01	39.4900		39.4900	0.1100	4.3439		(30)
Total net area of external elements Aum (A, m ²)			192.1900				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	53.1267		(33)
Main dwelling							
Party Wall 1			22.3600	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				0.0000	0.0500	0.0000	

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E2 Other lintels (including other steel lintels)	15.9200	0.0500	0.7960
E3 Sill	9.9500	0.0500	0.4975
E4 Jamb	31.8000	0.0500	1.5900
E5 Ground floor (normal)	22.3300	0.1600	3.5728
E6 Intermediate floor within a dwelling	22.3300	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	17.9200	0.0600	1.0752
E11 Eaves (insulation at rafter level)	0.0000	0.2400	0.0000
E12 Gable (insulation at ceiling level)	4.4100	0.0600	0.2646
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000
E16 Corner (normal)	10.1400	0.0900	0.9126
E17 Corner (inverted - internal area greater than external area)	0.0000	-0.0900	-0.0000
E18 Party wall between dwellings	10.1400	0.0600	0.6084
P1 Party wall - Ground floor	4.4100	0.0800	0.3528
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	4.4100	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	4.4100	0.1200	0.5292
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			10.1991 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	63.3258 (37)

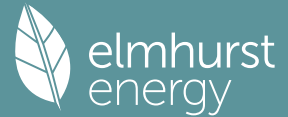
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	17.6120	17.4014	17.1908	16.1378	15.9272	14.8742	14.8742	14.6636	15.2954	15.9272	16.3484	16.7696 (38)
	80.9378	80.7272	80.5166	79.4636	79.2530	78.2000	78.2000	77.9894	78.6212	79.2530	79.6742	80.0954 (39)
Average = Sum(39)m / 12 =												79.4109
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0248	1.0221	1.0195	1.0061	1.0035	0.9901	0.9901	0.9875	0.9955	1.0035	1.0088	1.0141 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.4432 (42)
Hot water usage for mixer showers												
	65.1845	64.2049	62.7774	60.0463	58.0307	55.7830	54.5054	55.9220	57.4750	59.8883	62.6782	64.9348 (42a)
Hot water usage for baths												
	28.1547	27.7366	27.1477	26.0621	25.2491	24.3477	23.8608	24.4455	25.0821	26.0467	27.1547	28.0595 (42b)
Hot water usage for other uses												
	39.6510	38.2092	36.7673	35.3255	33.8836	32.4418	32.4418	33.8836	35.3255	36.7673	38.2092	39.6510 (42c)
Average daily hot water use (litres/day)												122.2482 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	132.9903	130.1507	126.6925	121.4338	117.1634	112.5724	110.8079	114.2511	117.8825	122.7023	128.0421	132.6453 (44)
Energy conte	210.6241	185.3328	194.7217	166.2368	157.7245	138.4209	134.0125	141.4667	145.3609	166.5059	182.4194	207.6905 (45)
Energy content (annual)										Total = Sum(45)m =		2030.5168
Distribution loss (46)m = 0.15 x (45)m												
	31.5936	27.7999	29.2083	24.9355	23.6587	20.7631	20.1019	21.2200	21.8041	24.9759	27.3629	31.1536 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss												
	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage												
	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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												
	276.7148	245.0277	260.8124	230.1956	223.8152	202.3797	200.1033	207.5575	209.3197	232.5967	246.3782	273.7813 (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												
	276.7148	245.0277	260.8124	230.1956	223.8152	202.3797	200.1033	207.5575	209.3197	232.5967	246.3782	273.7813 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2808.6822 (64)
Electric shower(s)												2809 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month												
	122.9051	109.3791	117.6176	106.4408	105.3160	97.1920	97.4318	99.9103	99.4996	108.2358	111.8215	121.9297 (65)

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	109.6006	121.3436	109.6006	113.2540	109.6006	113.2540	109.6006	109.6006	113.2540	109.6006	113.2540	109.6006 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	217.2955	219.5504	213.8682	201.7716	186.5018	172.1504	162.5627	160.3079	165.9900	178.0866	193.3564	207.7079 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289 (71)
Water heating gains (Table 5)												
	165.1950	162.7665	158.0881	147.8344	141.5538	134.9889	130.9567	134.2880	138.1938	145.4783	155.3076	163.8840 (72)
Total internal gains												
	554.7396	566.3088	544.2054	525.5084	500.3046	480.0416	462.7684	463.8449	477.0862	495.8139	524.5664	543.8409 (73)

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

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North	6.0000	10.6334	0.6300	0.7000	0.7700	19.4982 (74)
South	15.5100	46.7521	0.6300	0.7000	0.7700	221.6075 (78)
Northwest	0.8200	11.2829	0.6300	0.7000	0.7700	2.8275 (81)

Solar gains	243.9332	405.9536	536.0031	641.2514	704.3916	695.0751	671.7457	624.0453	571.7073	442.8498	290.2918	210.0530 (83)
Total gains	798.6728	972.2623	1080.2084	1166.7597	1204.6962	1175.1167	1134.5141	1087.8902	1048.7934	938.6637	814.8582	753.8939 (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	67.7647	67.9415	68.1192	69.0218	69.2053	70.1371	70.1371	70.3265	69.7614	69.2053	68.8394	68.4774
alpha	5.5176	5.5294	5.5413	5.6015	5.6137	5.6758	5.6758	5.6884	5.6508	5.6137	5.5893	5.5652
util living area	0.9768	0.9404	0.8780	0.7561	0.5961	0.4240	0.3030	0.3294	0.5112	0.7886	0.9452	0.9821 (86)
MIT	20.3484	20.5423	20.7156	20.8617	20.9250	20.9430	20.9451	20.9450	20.9384	20.8569	20.5921	20.3126 (87)
Th 2	20.0627	20.0649	20.0672	20.0782	20.0805	20.0916	20.0916	20.0938	20.0871	20.0805	20.0760	20.0716 (88)
util rest of house	0.9704	0.9260	0.8518	0.7141	0.5424	0.3647	0.2406	0.2647	0.4461	0.7410	0.9293	0.9770 (89)
MIT 2	19.3212	19.5598	19.7649	19.9332	19.9951	20.0202	20.0213	20.0237	20.0129	19.9347	19.6339	19.2840 (90)
Living area fraction									FLA = Living area / (4) =			0.1762 (91)
MIT	19.5023	19.7330	19.9324	20.0969	20.1590	20.1829	20.1841	20.1860	20.1760	20.0972	19.8028	19.4652 (92)
Temperature adjustment												0.0000
adjusted MIT	19.5023	19.7330	19.9324	20.0969	20.1590	20.1829	20.1841	20.1860	20.1760	20.0972	19.8028	19.4652 (93)

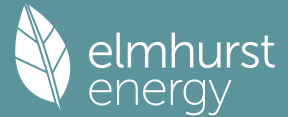
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9656	0.9200	0.8476	0.7150	0.5471	0.3707	0.2470	0.2713	0.4525	0.7420	0.9237	0.9729 (94)
Useful gains	771.2111	894.5279	915.6321	834.1786	659.0935	435.5828	280.2046	295.1423	474.6295	696.4559	752.6691	733.4375 (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	1230.4366	1197.4224	1081.5348	889.7427	670.4023	436.5787	280.2801	295.2714	477.7026	752.6840	1012.0847	1222.6759 (97)
Space heating kWh	341.6638	203.5451	123.4316	40.0061	8.4137	0.0000	0.0000	0.0000	0.0000	41.8337	186.7792	363.9933 (98a)
Space heating requirement - total per year (kWh/year)												1309.6666
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	341.6638	203.5451	123.4316	40.0061	8.4137	0.0000	0.0000	0.0000	0.0000	41.8337	186.7792	363.9933 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1309.6666
Space heating per m2										(98c) / (4) =		16.5823 (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 %)												87.5000 (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	341.6638	203.5451	123.4316	40.0061	8.4137	0.0000	0.0000	0.0000	0.0000	41.8337	186.7792	363.9933 (98)
Space heating efficiency (main heating system 1)	87.5000	87.5000	87.5000	87.5000	87.5000	0.0000	0.0000	0.0000	0.0000	87.5000	87.5000	87.5000 (210)
Space heating fuel (main heating system)	390.4729	232.6230	141.0647	45.7213	9.6157	0.0000	0.0000	0.0000	0.0000	47.8099	213.4620	415.9924 (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	276.7148	245.0277	260.8124	230.1956	223.8152	202.3797	200.1033	207.5575	209.3197	232.5967	246.3782	273.7813 (64)
Efficiency of water heater (217)m	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000	87.5000 (216)
Fuel for water heating, kWh/month	316.2455	280.0316	298.0714	263.0807	255.7889	231.2911	228.6895	237.2086	239.2226	265.8248	281.5751	312.8929 (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	24.1032	21.7706	24.1032	23.3257	24.1032	23.3257	24.1032	24.1032	23.3257	24.1032	23.3257	24.1032 (231)
Lighting	22.3074	17.8958	16.1132	11.8052	9.1187	7.4500	8.3184	10.8125	14.0444	18.4270	20.8133	22.9274 (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												1496.7618 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												92.5000

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Water heating fuel used	3209.9225	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)		
mechanical ventilation fans (SFP = 0.9940)	242.7959	(230a)
central heating pump	41.0000	(230c)
Total electricity for the above, kWh/year	283.7959	(231)
Electricity for lighting (calculated in Appendix L)	180.0334	(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	5170.5136	(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	1496.7618	0.2100	314.3200	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3209.9225	0.2100	674.0837	(264)
Space and water heating			988.4037	(265)
Pumps, fans and electric keep-hot	283.7959	0.1387	39.3660	(267)
Energy for lighting	180.0334	0.1443	25.9844	(268)
Total CO2, kg/year			1053.7541	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			13.3400	(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	1496.7618	1.1300	1691.3408	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3209.9225	1.1300	3627.2124	(278)
Space and water heating			5318.5533	(279)
Pumps, fans and electric keep-hot	283.7959	1.5128	429.3264	(281)
Energy for lighting	180.0334	1.5338	276.1412	(282)
Total Primary energy kWh/year			6024.0209	(286)
Dwelling Primary energy Rate (DPER)			76.2700	(287)

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

1. Overall dwelling characteristics

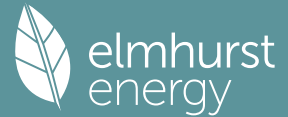
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	39.4900 (1b)	x 2.4100 (2b)	= 95.1709	(1b) - (3b)
First floor	39.4900 (1c)	x 2.6600 (2c)	= 105.0434	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	78.9800			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 200.2143	(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) =	0.1498 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3998	(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) =	0.3399 (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	0.4333	0.4248	0.4163	0.3738	0.3654	0.3229	0.3229	0.3144	0.3399	0.3654	0.3823	0.3993	(22b)
Effective ac	0.5939	0.5902	0.5867	0.5699	0.5667	0.5521	0.5521	0.5494	0.5578	0.5667	0.5731	0.5797	(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			2.1000	1.0000	2.1000			(26)
TER Opening Type			17.6600	1.1450	20.2214			(27)
FT01			39.4900	0.1300	5.1337			(28a)
WT02 Tile hung	113.2100	19.7600	93.4500	0.1800	16.8210			(29a)
RT01	39.4900		39.4900	0.1100	4.3439			(30)
Total net area of external elements Aum (A, m2)			192.1900					(31)
Fabric heat loss, W/K = Sum (A x U)					48.6200			(33)
Main dwelling								
Party Wall 1			22.3600	0.0000	0.0000			(32)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	15.9200	0.0500	0.7960	
E3 Sill	9.9500	0.0500	0.4975	
E4 Jamb	31.8000	0.0500	1.5900	
E5 Ground floor (normal)	22.3300	0.1600	3.5728	
E6 Intermediate floor within a dwelling	22.3300	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	17.9200	0.0600	1.0752	
E11 Eaves (insulation at rafter level)	0.0000	0.0400	0.0000	
E12 Gable (insulation at ceiling level)	4.4100	0.0600	0.2646	
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000	
E16 Corner (normal)	10.1400	0.0900	0.9126	
E17 Corner (inverted - internal area greater than external area)	0.0000	-0.0900	-0.0000	
E18 Party wall between dwellings	10.1400	0.0600	0.6084	
P1 Party wall - Ground floor	4.4100	0.0800	0.3528	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	4.4100	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	4.4100	0.1200	0.5292	

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

10.1991 (36)

Point Thermal bridges

(33a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 58.8191 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.2385	38.9976	38.7615	37.6525	37.4450	36.4791	36.4791	36.3003	36.8512	37.4450	37.8648	38.3036	(38)
Heat transfer coeff	98.0575	97.8167	97.5806	96.4716	96.2641	95.2982	95.2982	95.1193	95.6703	96.2641	96.6838	97.1227	(39)
Average = Sum(39)m / 12 =												96.4706	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2415	1.2385	1.2355	1.2215	1.2188	1.2066	1.2066	1.2043	1.2113	1.2188	1.2242	1.2297	(40)
HLP (average)												1.2215	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.4432 (42)
Hot water usage for mixer showers												
65.1845	64.2049	62.7774	60.0463	58.0307	55.7830	54.5054	55.9220	57.4750	59.8883	62.6782	64.9348	(42a)
Hot water usage for baths												
28.1547	27.7366	27.1477	26.0621	25.2491	24.3477	23.8608	24.4455	25.0821	26.0467	27.1547	28.0595	(42b)
Hot water usage for other uses												
39.6510	38.2092	36.7673	35.3255	33.8836	32.4418	32.4418	33.8836	35.3255	36.7673	38.2092	39.6510	(42c)
Average daily hot water use (litres/day)												122.2482 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	132.9903	130.1507	126.6925	121.4338	117.1634	112.5724	110.8079	114.2511	117.8825	122.7023	128.0421	132.6453	(44)
Energy conte	210.6241	185.3328	194.7217	166.2368	157.7245	138.4209	134.0125	141.4667	145.3609	166.5059	182.4194	207.6905	(45)
Energy content (annual)										Total = Sum(45)m =		2030.5168	

Energy content (annual)												Total = Sum(45)/m = 2050.9166	
Distribution loss (46)m = 0.15 x (45)m													
31.5936	27.7999	29.2083	24.9355	23.6587	20.7631	20.1019	21.2200	21.8041	24.9759	27.3629	31.1536 (46)		

Water storage loss (or HIU loss):

Store volume 200.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day):

Temperature factor from Table 2b 1.6525 (48)

Enter (49) or (54) in (55) 0.5400 (49)

Total storage loss 0.8924 (55)

27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)
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If cylinder contains dedicated solar storage

27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(57)
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Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	(59)
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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)
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Total heat required for water heating calculated for each month

261.5501	231.3306	245.6478	215.5201	208.6506	187.7042	184.9386	192.3928	194.6442	217.4320	231.7027	258.6166	(62)
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WWHRS	-29.7996	-26.3550	-27.5975	-22.8518	-21.2971	-18.2240	-17.0821	-18.1651	-18.8553	-22.2283	-25.1820	-29.2478	(63a)
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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)
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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)
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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)
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Output from w/h	231.7505	204.9755	218.0503	192.6683	187.3535	169.4802	167.8565	174.2277	175.7889	195.2036	206.5207	229.3688	(64)
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12Total per year (kWh/year) Total per year (kWh/year) = Sum(64)m = 2353.2445 (64)

Electric shower(s) 2353 (64)

0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (64a)

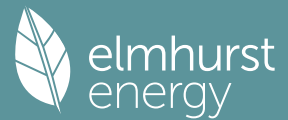
Heat gains from water heating, kWh/month Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

110.7734	98.4214	105.4858	94.7004	93.1842	85.4516	85.3000	87.7786	87.7592	96.1041	100.0811	109.7980	(65)
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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
(66)m	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	(66)

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Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	109.5948	121.3371	109.5948	113.2480	109.5948	113.2480	109.5948	113.2480	109.5948	113.2480	109.5948	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	217.2955	219.5504	213.8682	201.7716	186.5018	172.1504	162.5627	160.3079	165.9900	178.0866	193.3564	207.7079 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289 (71)
Water heating gains (Table 5)	148.8889	146.4603	141.7820	131.5283	125.2476	118.6828	114.6506	117.9819	121.8877	129.1721	139.0015	147.5779 (72)
Total internal gains	538.4276	549.9962	527.8934	509.1962	483.9926	463.7295	446.4565	447.5330	460.7741	479.5019	508.2543	527.5289 (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			
North				4.7600	10.6334	0.6300	0.7000	0.7700	15.4686 (74)			
South				12.2500	46.7521	0.6300	0.7000	0.7700	175.0285 (78)			
Northwest				0.6500	11.2829	0.6300	0.7000	0.7700	2.2413 (81)			
Solar gains	192.7384	320.7751	423.5949	506.8756	556.8857	549.5657	531.1011	493.3138	451.8461	349.9449	229.3711	165.9665 (83)
Total gains	731.1660	870.7713	951.4883	1016.0718	1040.8783	1013.2952	977.5575	940.8468	912.6201	829.4468	737.6254	693.4954 (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	55.9337	56.0715	56.2071	56.8532	56.9758	57.5533	57.5533	57.6615	57.3294	56.9758	56.7284	56.4721
alpha	4.7289	4.7381	4.7471	4.7902	4.7984	4.8369	4.8369	4.8441	4.8220	4.7984	4.7819	4.7648
util living area	0.9877	0.9721	0.9445	0.8793	0.7599	0.5802	0.4248	0.4589	0.6738	0.8953	0.9736	0.9902 (86)
MIT	19.7779	20.0271	20.3101	20.6331	20.8602	20.9705	20.9946	20.9922	20.9394	20.6534	20.1620	19.7358 (87)
Th 2	19.8869	19.8893	19.8917	19.9029	19.9050	19.9147	19.9147	19.9165	19.9110	19.9050	19.9007	19.8963 (88)
util rest of house	0.9838	0.9638	0.9281	0.8449	0.6978	0.4909	0.3222	0.3540	0.5861	0.8577	0.9642	0.9871 (89)
MIT 2	18.5009	18.8147	19.1651	19.5538	19.7958	19.8992	19.9132	19.9140	19.8746	19.5880	18.9961	18.4544 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	18.7260	19.0284	19.3669	19.7440	19.9834	20.0880	20.1038	20.1041	20.0623	19.7758	19.2016	18.6802 (92)
Temperature adjustment	0.0000											
adjusted MIT	18.7260	19.0284	19.3669	19.7440	19.9834	20.0880	20.1038	20.1041	20.0623	19.7758	19.2016	18.6802 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9782	0.9554	0.9185	0.8391	0.7027	0.5057	0.3403	0.3725	0.5990	0.8525	0.9563	0.9822 (94)
Ext temp.	715.2169	831.9253	873.9607	852.6186	731.3792	512.4494	332.6812	350.4301	546.6933	707.0955	705.3647	681.1830 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Space heating kWh	1414.5735	1381.9908	1255.5599	1046.1405	797.3906	522.9965	333.9014	352.3278	570.4143	883.2956	1170.0296	1406.3585 (97)
Space heating requirement - total per year (kWh/year)	520.3213	369.6440	283.9098	139.3358	49.1125	0.0000	0.0000	0.0000	0.0000	131.0928	334.5587	539.5306 (98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	520.3213	369.6440	283.9098	139.3358	49.1125	0.0000	0.0000	0.0000	0.0000	131.0928	334.5587	539.5306 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	2367.5056											
Space heating per m2	(98c) / (4) = 29.9760 (99)											

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

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000 (201)											
Fraction of space heat from main system(s)	1.0000 (202)											
Efficiency of main space heating system 1 (in %)	92.3000 (206)											
Efficiency of main space heating system 2 (in %)	0.0000 (207)											
Efficiency of secondary/supplementary heating system, %	0.0000 (208)											
Space heating requirement	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating efficiency (main heating system 1)	520.3213	369.6440	283.9098	139.3358	49.1125	0.0000	0.0000	0.0000	0.0000	131.0928	334.5587	539.5306 (98)
Space heating fuel (main heating system)	92.3000	92.3000	92.3000	92.3000	92.3000	0.0000	0.0000	0.0000	0.0000	92.3000	92.3000	92.3000 (210)
Space heating efficiency (main heating system 2)	563.7284	400.4810	307.5946	150.9597	53.2096	0.0000	0.0000	0.0000	0.0000	142.0291	362.4688	584.5402 (211)
Space heating fuel (main heating system 2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (212)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (213)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (215)
Water heating												
Water heating requirement	231.7505	204.9755	218.0503	192.6683	187.3535	169.4802	167.8565	174.2277	175.7889	195.2036	206.5207	229.3688 (64)
Efficiency of water heater (217)m	85.8175	85.3657	84.6527	83.3451	81.5159	79.8000	79.8000	79.8000	79.8000	83.1873	85.1352	79.8000 (216)
Fuel for water heating, kWh/month	270.0503	240.1147	257.5822	231.1693	229.8367	212.3812	210.3465	218.3304	220.2869	234.6556	242.5797	266.9883 (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)

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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	22.7716	18.2683	16.4485	12.0509	9.3085	7.6051	8.4915	11.0376	14.3367	18.8105	21.2465	23.4045	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-36.8141	-51.8367	-74.4273	-83.5949	-90.0730	-84.0489	-82.9986	-78.3749	-70.2229	-59.2131	-40.4448	-31.8346	(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	-21.0070	-44.1652	-87.7340	-131.7058	-174.0892	-174.9002	-172.8527	-146.3935	-107.3473	-63.1536	-28.0449	-16.6149	(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												2565.0115	(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												2834.3219	(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)												183.7802	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1951.8922	(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												3717.2213	(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	2565.0115	0.2100	538.6524	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2834.3219	0.2100	595.2076	(264)
Space and water heating			1133.8600	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	183.7802	0.1443	26.5252	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-783.8838	0.1346	-105.5187	
PV Unit electricity exported	-1168.0084	0.1259	-147.0633	
Total			-252.5820	(269)
Total CO2, kg/year			919.7324	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.6500	(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	2565.0115	1.1300	2898.4629	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2834.3219	1.1300	3202.7837	(278)
Space and water heating			6101.2466	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	183.7802	1.5338	281.8882	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-783.8838	1.4975	-1173.8643	
PV Unit electricity exported	-1168.0084	0.4622	-539.8242	
Total			-1713.6884	(283)
Total Primary energy kWh/year			4799.5472	(286)
Target Primary Energy Rate (TPER)			60.7700	(287)

Summary for Input Data



Plot Reference	AT01	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	4.39	TER	10.86
Environmental	96 A	% DER < TER			59.58
CO ₂ Emissions (t/year)	0.38	DFEE	37.27	TFEE	37.79
Compliance Check	See BREL	% DFEE < TFEE			1.38
% DPER < TPER	17.67	DPER	46.57	TPER	56.56

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Semi-Detached
2.0 Number of Storeys	2
3.0 Date Built	2026
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Enter TMP value
Thermal Mass	250.00

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	23.11 m	46.51 m²	2.40 m
		23.11 m	46.51 m²	2.69 m

8.0 Living Area	18.82	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		55.46	35.86	0.00	None	19.60	Enter Gross Area
	WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		62.05	50.97	0.00	None	11.08	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
	Party Wall 1	Solid Wall	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00		26.39	0.00	None

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	46.51	46.51	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	46.51

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
	DG Win	Manufacturer	Window	Double Low-E Soft	0.05		0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00

Summary for Input Data

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	North West	2.10	
D002	DG Win	WT01 Brick	South East	5.22	
D003	DG Win	WT01 Brick	South East	5.22	
W001	DG Win	WT01 Brick	North West	2.17	
W002	DG Win	WT01 Brick	North West	2.17	
W003	DG Win	WT02 Tile hung	North West	1.48	
W004	DG Win	WT02 Tile hung	North West	0.82	
W005	DG Win	WT02 Tile hung	North West	1.48	
W006	DG Win	WT01 Brick	South West	2.72	
W007	DG Win	WT02 Tile hung	South West	2.17	
W008	DG Win	WT02 Tile hung	South East	2.17	
W009	DG Win	WT02 Tile hung	South East	1.48	
W010	DG Win	WT02 Tile hung	South East	1.48	

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	20.04	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	14.07	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	38.42	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	23.11	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	23.11	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	14.92	0.06	0.06 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.24	0.24 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	8.19	0.06	0.06 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	10.17	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	0.00	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	10.17	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	5.19	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	5.19	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	5.19	0.12	0.12 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
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

Summary for Input Data

Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Test Method

22.0 Lighting
No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1

Percentage of Heat %

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Controls description

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Flow Temperature Value

25.0 Main Heating 2

26.0 Heat Networks

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

Supplementary Immersion

Immersion Only Heating Hot Water

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Summary for Input Data

Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

34.0 Small-scale Hydro

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

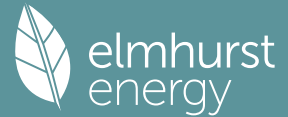
Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT01				Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref				
Plot Address					SAP Version	10.2
SAP Rating	81 B	DER	4.39	TER	10.86	
Environmental	96 A	% DER < TER				59.58
CO ₂ Emissions (t/year)	0.38	DFEE	37.27	TFEE	37.79	
Compliance Check	See BREL	% DFEE < TFEE				1.38
% DPER < TPER	17.67	DPER	46.57	TPER	56.56	
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC					

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	46.5100 (1b)	x 2.4000 (2b)	= 111.6240 (1b) - (3b)
First floor	46.5100 (1c)	x 2.6900 (2c)	= 125.1119 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 236.7359 (5)

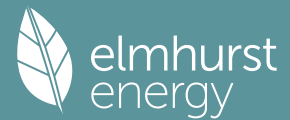
2. Ventilation rate

											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											0 * 10 =	0.0000 (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) =											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)
Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind factor	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) =											79.2000 (23c)	
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			28.5800	1.1450	32.7252		(27)
Solid door			2.1000	1.0000	2.1000		(26)
FT01			46.5100	0.1300	6.0463		(28a)
WT01 Brick	55.4600	19.6000	35.8600	0.1800	6.4548		(29a)
WT02 Tile hung	62.0500	11.0800	50.9700	0.1800	9.1746		(29a)
RT01	46.5100		46.5100	0.1100	5.1161		(30)
Total net area of external elements Aum(A, m ²)			210.5300				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	61.6170		(33)
Main dwelling							
Party Wall 1			26.3900	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

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E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	20.0400	0.0500	1.0020
E3 Sill	14.0700	0.0500	0.7035
E4 Jamb	38.4200	0.0500	1.9210
E5 Ground floor (normal)	23.1100	0.1600	3.6976
E6 Intermediate floor within a dwelling	23.1100	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	14.9200	0.0600	0.8952
E11 Eaves (insulation at rafter level)	0.0000	0.2400	0.0000
E12 Gable (insulation at ceiling level)	8.1900	0.0600	0.4914
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000
E16 Corner (normal)	10.1700	0.0900	0.9153
E17 Corner (inverted - internal area greater than external area)	0.0000	-0.0900	-0.0000
E18 Party wall between dwellings	10.1700	0.0600	0.6102
P1 Party wall - Ground floor	5.1900	0.0800	0.4152
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	5.1900	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	5.1900	0.1200	0.6228
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			11.2742 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	72.8912 (37)

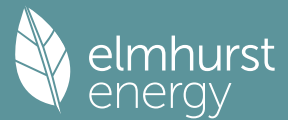
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	20.8246	20.5756	20.3266	19.0815	18.8325	17.5874	17.5874	17.3384	18.0854	18.8325	19.3305	19.8286	(38)
Average = Sum(39)m / 12 =	93.7158	93.4668	93.2178	91.9727	91.7237	90.4786	90.4786	90.2296	90.9766	91.7237	92.2217	92.7197	(39)
												91.9104	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0075	1.0048	1.0021	0.9887	0.9861	0.9727	0.9727	0.9700	0.9780	0.9861	0.9914	0.9968	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.6648 (42)
Hot water usage for mixer showers												
68.9004	67.8650	66.3561	63.4692	61.3388	58.9629	57.6125	59.1099	60.7514	63.3023	66.2512	68.6364	(42a)
Hot water usage for baths												
29.7527	29.3108	28.6885	27.5412	26.6821	25.7296	25.2150	25.8329	26.5057	27.5250	28.6959	29.6521	(42b)
Hot water usage for other uses												
41.9206	40.3963	38.8719	37.3475	35.8231	34.2987	34.2987	35.8231	37.3475	38.8719	40.3963	41.9206	(42c)
Average daily hot water use (litres/day)												129.2189 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	140.5737	137.5720	133.9165	128.3580	123.8440	118.9912	117.1262	120.7659	124.6045	129.6992	135.3434	140.2091 (44)
Energy conte	222.6344	195.9007	205.8247	175.7156	166.7179	146.3136	141.6540	149.5334	153.6498	176.0005	192.8214	219.5336 (45)
Energy content (annual)										Total = Sum(45)m =		2146.2997
Distribution loss (46)m = 0.15 x (45)m												
33.3952	29.3851	30.8737	26.3573	25.0077	21.9470	21.2481	22.4300	23.0475	26.4001	28.9232	32.9300	(46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss												
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage												
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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												
288.7251	255.5956	271.9155	239.6744	232.8086	210.2724	207.7448	215.6242	217.6086	242.0913	256.7802	285.6244	(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												
288.7251	255.5956	271.9155	239.6744	232.8086	210.2724	207.7448	215.6242	217.6086	242.0913	256.7802	285.6244	(64)
Total per year (kWh/year)												2924.4651 (64)
Electric shower(s)												2924 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)
Heat gains from water heating, kWh/month												
126.8985	112.8929	121.3093	109.5925	108.3063	99.8163	99.9726	102.5925	102.2556	111.3928	115.2802	125.8675	(65)

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
123.3350	136.5494	123.3350	127.4461	123.3350	127.4461	123.3350	123.3350	123.3350	127.4461	123.3350	127.4461	123.3350 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
244.5253	247.0628	240.6686	227.0561	209.8728	193.7229	182.9338	180.3964	186.7906	200.4031	217.5864	233.7362	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937 (71)
Water heating gains (Table 5)												
170.5626	167.9954	163.0502	152.2118	145.5730	138.6337	134.3717	137.8931	142.0217	149.7215	160.1113	169.1768	(72)
Total internal gains												
604.3955	617.5802	593.0263	572.6866	544.7534	522.7754	503.6131	504.5971	519.2310	539.4321	571.1165	592.2206	(73)

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

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	W/m2			or Table 6b			or Table 6c			Table 6d		
Southeast	15.5700			36.7938			0.6300			0.7700		
Southwest	4.8900			36.7938			0.6300			0.7700		
Northwest	8.1200			11.2829			0.6300			0.7700		

Solar gains	258.0655	448.8813	638.8823	833.0126	970.8374	980.4411	938.3316	832.9665	705.7115	502.7701	310.7967	219.7544 (83)
Total gains	862.4610	1066.4615	1231.9086	1405.6992	1515.5908	1503.2165	1441.9447	1337.5636	1224.9425	1042.2023	881.9131	811.9750 (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	68.9288	69.1125	69.2971	70.2352	70.4259	71.3950	71.3950	71.5921	71.0042	70.4259	70.0456	69.6693
alpha	5.5953	5.6075	5.6198	5.6823	5.6951	5.7597	5.7597	5.7728	5.7336	5.6951	5.6697	5.6446
util living area	0.9837	0.9529	0.8854	0.7363	0.5533	0.3842	0.2760	0.3101	0.5070	0.8105	0.9592	0.9877 (86)
MIT	20.3086	20.5109	20.7130	20.8761	20.9327	20.9448	20.9460	20.9459	20.9399	20.8483	20.5573	20.2732 (87)
Th 2	20.0771	20.0793	20.0816	20.0927	20.0950	20.1062	20.1062	20.1084	20.1017	20.0950	20.0905	20.0860 (88)
util rest of house	0.9790	0.9409	0.8603	0.6942	0.5027	0.3310	0.2200	0.2501	0.4433	0.7650	0.9466	0.9841 (89)
MIT 2	19.2838	19.5353	19.7757	19.9614	20.0158	20.0364	20.0370	20.0393	20.0289	19.9409	19.6055	19.2467 (90)
Living area fraction	FLA = Living area / (4) =											
MIT	19.4912	19.7327	19.9653	20.1465	20.2013	20.2202	20.2209	20.2228	20.2132	20.1245	19.7981	19.4544 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.4912	19.7327	19.9653	20.1465	20.2013	20.2202	20.2209	20.2228	20.2132	20.1245	19.7981	19.4544 (93)

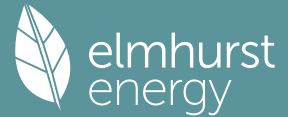
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9752	0.9356	0.8568	0.6968	0.5088	0.3378	0.2272	0.2578	0.4513	0.7666	0.9417	0.9810 (94)
Useful gains	841.0918	997.8103	1055.4681	979.4875	771.0695	507.8505	327.5637	344.8239	552.8578	798.9823	830.5350	796.5087 (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	1423.6520	1386.3607	1255.2061	1034.3686	779.7708	508.5052	327.6134	344.9263	556.1565	873.6209	1171.0385	1414.3813 (97)
Space heating kWh	433.4248	261.1059	148.6051	39.5144	6.4737	0.0000	0.0000	0.0000	0.0000	55.5311	245.1625	459.6972 (98a)
Space heating requirement - total per year (kWh/year)												1649.5147
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	433.4248	261.1059	148.6051	39.5144	6.4737	0.0000	0.0000	0.0000	0.0000	55.5311	245.1625	459.6972 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1649.5147
Space heating per m2												(98c) / (4) = 17.7329 (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 %)													249.9000 (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	433.4248	261.1059	148.6051	39.5144	6.4737	0.0000	0.0000	0.0000	0.0000	55.5311	245.1625	459.6972 (98)	
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)	
Space heating fuel (main heating system)	173.4393	104.4841	59.4658	15.8121	2.5905	0.0000	0.0000	0.0000	0.0000	22.2213	98.1043	183.9525 (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	288.7251	255.5956	271.9155	239.6744	232.8086	210.2724	207.7448	215.6242	217.6086	242.0913	256.7802	285.6244 (64)	
Efficiency of water heater (217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)	
Fuel for water heating, kWh/month	164.8916	145.9712	155.2915	136.8786	132.9575	120.0870	118.6435	123.1434	124.2768	138.2589	146.6478	163.1207 (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	24.3826	22.0230	24.3826	23.5960	24.3826	23.5960	24.3826	24.3826	23.5960	24.3826	23.5960	24.3826 (231)	
Lighting	25.1028	20.1384	18.1324	13.2846	10.2614	8.3836	9.3608	12.1675	15.8044	20.7362	23.4215	25.8005 (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												660.0699 (211)	
Space heating fuel - main system 2												0.0000 (213)	
Space heating fuel - secondary												0.0000 (215)	

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Efficiency of water heater	175.1000	
Water heating fuel used	1670.1685	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)		
mechanical ventilation fans (SFP = 0.9940)	287.0849	(230a)
Total electricity for the above, kWh/year	287.0849	(231)
Electricity for lighting (calculated in Appendix L)	202.5938	(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	2819.9171	(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	660.0699	0.1583	104.5095	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1670.1685	0.1408	235.1858	(264)
Space and water heating			339.6953	(265)
Pumps, fans and electric keep-hot	287.0849	0.1387	39.8222	(267)
Energy for lighting	202.5938	0.1443	29.2405	(268)
Total CO2, kg/year			408.7580	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.3900	(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	660.0699	1.5861	1046.9071	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1670.1685	1.5207	2539.7933	(278)
Space and water heating			3586.7004	(279)
Pumps, fans and electric keep-hot	287.0849	1.5128	434.3020	(281)
Energy for lighting	202.5938	1.5338	310.7451	(282)
Total Primary energy kWh/year			4331.7475	(286)
Dwelling Primary energy Rate (DPER)			46.5700	(287)

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

1. Overall dwelling characteristics

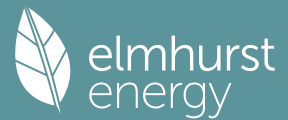
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	46.5100 (1b)	x 2.4000 (2b)	= 111.6240	(1b) - (3b)
First floor	46.5100 (1c)	x 2.6900 (2c)	= 125.1119	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0200			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	236.7359	(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) =	0.1267 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3767	(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) =	0.3202 (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	0.4083	0.4003	0.3923	0.3522	0.3442	0.3042	0.3042	0.2962	0.3202	0.3442	0.3602	0.3763	(22b)
Effective ac	0.5833	0.5801	0.5769	0.5620	0.5592	0.5463	0.5463	0.5439	0.5513	0.5592	0.5649	0.5708	(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			2.1000	1.0000	2.1000			(26)					
TER Opening Type			21.1800	1.1450	24.2519			(27)					
FT01			46.5100	0.1300	6.0463			(28a)					
WT01 Brick	55.4600	15.0500	40.4100	0.1800	7.2738			(29a)					
WT02 Tile hung	62.0500	8.2300	53.8200	0.1800	9.6876			(29a)					
RT01	46.5100		46.5100	0.1100	5.1161			(30)					
Total net area of external elements Aum(A, m2)			210.5300					(31)					
Fabric heat loss, W/K = Sum (A x U)					(26)... (30) + (32) =	54.4757		(33)					
Main dwelling													
Party Wall 1			26.3900	0.0000	0.0000			(32)					
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)					
List of Thermal Bridges													
K1 Element				Length	Psi-value		Total						
E1 Steel lintel with perforated steel base plate				0.0000	0.0500		0.0000						
E2 Other lintels (including other steel lintels)				20.0400	0.0500		1.0020						
E3 Sill				14.0700	0.0500		0.7035						
E4 Jamb				38.4200	0.0500		1.9210						
E5 Ground floor (normal)				23.1100	0.1600		3.6976						
E6 Intermediate floor within a dwelling				23.1100	0.0000		0.0000						
E10 Eaves (insulation at ceiling level)				14.9200	0.0600		0.8952						
E11 Eaves (insulation at rafter level)				0.0000	0.0400		0.0000						
E12 Gable (insulation at ceiling level)				8.1900	0.0600		0.4914						
E13 Gable (insulation at rafter level)				0.0000	0.0800		0.0000						
E16 Corner (normal)				10.1700	0.0900		0.9153						
E17 Corner (inverted - internal area greater than external area)				0.0000	-0.0900		-0.0000						
E18 Party wall between dwellings				10.1700	0.0600		0.6102						
P1 Party wall - Ground floor				5.1900	0.0800		0.4152						
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				0.0000	0.0000		0.0000						
P2 Party wall - Intermediate floor within a dwelling				5.1900	0.0000		0.0000						
P4 Party wall - Roof (insulation at ceiling level)				5.1900	0.1200		0.6228						
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								11.2742 (36)					
Point Thermal bridges							(36a) =	0.0000					
Total fabric heat loss							(33) + (36) + (36a) =	65.7499 (37)					
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan 45.5725	Feb 45.3197	Mar 45.0718	Apr 43.9078	May 43.6900	Jun 42.6762	Jul 42.6762	Aug 42.4884	Sep 43.0667	Oct 43.6900	Nov 44.1306	Dec 44.5912	(38)
Heat transfer coeff	111.3224	111.0696	110.8217	109.6577	109.4399	108.4261	108.4261	108.2383	108.8166	109.4399	109.8805	110.3411	(39)
Average = Sum(39)m / 12 =													109.6567
HLP	Jan 1.1968	Feb 1.1940	Mar 1.1914	Apr 1.1789	May 1.1765	Jun 1.1656	Jul 1.1656	Aug 1.1636	Sep 1.1698	Oct 1.1765	Nov 1.1813	Dec 1.1862	(40)
HLP (average)													1.1789
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	

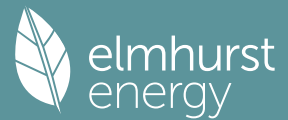
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6648 (42)
Hot water usage for mixer showers	68.9004	67.8650	66.3561	63.4692	61.3388	58.9629	57.6125	59.1099	60.7514	63.3023	66.2512	68.6364 (42a)	
Hot water usage for baths	29.7527	29.3108	28.6885	27.5412	26.6821	25.7296	25.2150	25.8329	26.5057	27.5250	28.6959	29.6521 (42b)	
Hot water usage for other uses	41.9206	40.3963	38.8719	37.3475	35.8231	34.2987	34.2987	35.8231	37.3475	38.8719	40.3963	41.9206 (42c)	
Average daily hot water use (litres/day)												129.2189 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	140.5737	137.5720	133.9165	128.3580	123.8440	118.9912	117.1262	120.7659	124.6045	129.6992	135.3434	140.2091 (44)	
Energy content (annual)	222.6344	195.9007	205.8247	175.7156	166.7179	146.3136	141.6540	149.5334	153.6498	176.0005	192.8214	219.5336 (45)	
Distribution loss (46)m = 0.15 x (45)m	33.3952	29.3851	30.8737	26.3573	25.0077	21.9470	21.2481	22.4300	23.0475	26.4001	28.9232	32.9300 (46)	
Water storage loss (or HIU loss):													
Store volume												200.0000 (47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.6525 (48)	
Temperature factor from Table 2b												0.5400 (49)	
Enter (49) or (54) in (55)												0.8924 (55)	
Total storage loss	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (56)	
If cylinder contains dedicated solar storage	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (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	273.5605	241.8984	256.7508	224.9989	217.6439	195.5968	192.5801	200.4595	202.9331	226.9266	242.1047	270.4597 (62)	
WWHRS	-31.4984	-27.8574	-29.1707	-24.1545	-22.5111	-19.2629	-18.0559	-19.2007	-19.9302	-23.4955	-26.6175	-30.9151 (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	242.0621	214.0410	227.5801	200.8444	195.1328	176.3339	174.5242	181.2588	183.0030	203.4311	215.4872	239.5446 (64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2453.2433 (64)	
Electric shower(s)												2453 (64)	
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)	
												0.0000 (64a)	
Heat gains from water heating, kWh/month	114.7668	101.9352	109.1776	97.8521	96.1745	88.0759	87.8408	90.4607	90.5152	99.2610	103.5398	113.7358 (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
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(66)m	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	133.2421	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	123.3096	136.5214	123.3096	127.4199	123.3096	127.4199	123.3096	123.3096	127.4199	123.3096	127.4199	123.3096	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	244.5253	247.0628	240.6686	227.0561	209.8728	193.7229	182.9338	180.3964	186.7906	200.4031	217.5864	233.7362	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	36.3242	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	-106.5937	(71)
Water heating gains (Table 5)	154.2564	151.6893	146.7441	135.9057	129.2669	122.3276	118.0656	121.5870	125.7156	133.4154	143.8052	152.8707	(72)
Total internal gains	588.0640	601.2460	576.6949	556.3543	528.4219	506.4431	487.2817	488.2657	502.8987	523.1007	554.7842	575.8892	(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
Southeast				11.5300	36.7938		0.6300		0.7000		0.7700		129.6511 (77)
Southwest				3.6200	36.7938		0.6300		0.7000		0.7700		40.7057 (79)
Northwest				6.0300	11.2829		0.6300		0.7000		0.7700		20.7927 (81)
Solar gains	191.1495	332.5049	473.2926	617.1813	719.3607	726.5040	695.2898	617.1720	522.8256	372.4350	230.2108	162.7703	(83)
Total gains	779.2136	933.7509	1049.9875	1173.5357	1247.7826	1232.9471	1182.5715	1105.4377	1025.7243	895.5357	784.9950	738.6595	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
tau	58.0272	58.1592	58.2893	58.9081	59.0253	59.5772	59.5772	59.6805	59.3634	59.0253	58.7886	58.5432	
alpha	4.8685	4.8773	4.8860	4.9272	4.9350	4.9718	4.9718	4.9787	4.9576	4.9350	4.9192	4.9029	
util living area	0.9915	0.9795	0.9528	0.8780	0.7373	0.5482	0.4008	0.4457	0.6825	0.9140	0.9812	0.9934	(86)
MIT	19.7585	20.0012	20.3063	20.6601	20.8878	20.9793	20.9964	20.9940	20.9417	20.6334	20.1325	19.7178	(87)
Th 2	19.9226	19.9248	19.9269	19.9369	19.9388	19.9476	19.9476	19.9492	19.9442	19.9388	19.9350	19.9310	(88)
util rest of house	0.9888	0.9732	0.9385	0.8438	0.6754	0.4644	0.3063	0.3463	0.5966	0.8814	0.9744	0.9912	(89)
MIT 2	18.5023	18.8097	19.1893	19.6133	19.8522	19.9368	19.9466	19.9473	19.9089	19.5963	18.9860	18.4567	(90)
Living area fraction	18.7565	19.0508	19.4153	19.8251	20.0617	20.1478	20.1590	20.1591	20.1178	19.8061	19.2179	18.7118	(92)
MIT	18.7565	19.0508	19.4153	19.8251	20.0617	20.1478	20.1590	20.1591	20.1178	19.8061	19.2179	18.7118	(93)
Temperature adjustment												0.0000	
adjusted MIT	18.7565	19.0508	19.4153	19.8251	20.0617	20.1478	20.1590	20.1591	20.1178	19.8061	19.2179	18.7118	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9847	0.9664	0.9301	0.8398	0.6831	0.4807	0.3255	0.3665	0.6116	0.8765	0.9681	0.9877	(94)
Useful gains	767.2782	902.3796	976.5653	985.4784	852.3198	592.7119	384.8905	405.0978	627.3501	784.9148	759.9505	729.6046	(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	1609.3285	1571.7220	1431.2951	1198.0200	915.1029	601.5217	385.8844	406.8766	654.8415	1007.5176	1331.5246	1601.2529	(97)
Space heating kWh	626.4855	449.7981	338.3190	153.0299	46.7106	0.0000	0.0000	0.0000	0.0000	165.6165	411.5333	648.5063	(98a)
Space heating requirement - total per year (kWh/year)												2839.9993	
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	626.4855	449.7981	338.3190	153.0299	46.7106	0.0000	0.0000	0.0000	0.0000	165.6165	411.5333	648.5063	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2839.9993	
Space heating per m2										(98c) / (4) =		30.5311	(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	626.4855	449.7981	338.3190	153.0299	46.7106	0.0000	0.0000	0.0000	0.0000	165.6165	411.5333	648.5063	(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)	678.7491	487.3218	366.5428	165.7962	50.6074	0.0000	0.0000	0.0000	0.0000	179.4329	445.8649	702.6071	(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	242.0621	214.0410	227.5801	200.8444	195.1328	176.3339	174.5242	181.2588	183.0030	203.4311	215.4872	239.5446	(64)
Efficiency of water heater (217)m	86.0939	85.6842	84.9471	83.4578	81.3933	79.8000	79.8000	79.8000	79.8000	83.6025	85.4866	79.8000	(216)
Fuel for water heating, kWh/month	281.1606	249.8023	267.9079	240.6538	239.7406	220.9698	218.7019	227.1414	229.3270	243.3314	252.0714	277.9640	(217)
Space cooling fuel requirement													

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(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	7.0685	7.3041	7.0685	7.3041	7.0685	(231)
Lighting	25.6213	20.5544	18.5069	13.5590	10.4733	8.5568	9.5541	12.4188	16.1308	21.1645	23.9053	26.3334	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-42.8187	-60.0166	-85.7742	-95.8646	-102.8731	-95.8155	-94.5895	-89.5088	-80.5133	-68.3077	-46.9326	-37.0570	(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	-25.2811	-53.0513	-105.2140	-157.7093	-208.2483	-209.1660	-206.7436	-175.2159	-128.6228	-75.8118	-33.7323	-20.0052	(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												3076.9223	(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												2948.7722	(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)												206.7786	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-2298.8733	(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												4019.5998	(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	3076.9223	0.2100	646.1537 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2948.7722	0.2100	619.2422 (264)
Space and water heating			1265.3958 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	206.7786	0.1443	29.8445 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-900.0716	0.1347	-121.2553
PV Unit electricity exported	-1398.8016	0.1260	-176.1803
Total			-297.4356 (269)
Total CO2, kg/year			1009.7341 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.8600 (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	3076.9223	1.1300	3476.9222 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2948.7722	1.1300	3332.1126 (278)
Space and water heating			6809.0348 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	206.7786	1.5338	317.1639 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-900.0716	1.4979	-1348.2174
PV Unit electricity exported	-1398.8016	0.4623	-646.7058
Total			-1994.9232 (283)
Total Primary energy kWh/year			5261.3763 (286)
Target Primary Energy Rate (TPER)			56.5600 (287)

Summary for Input Data



Plot Reference	AT02	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	3.95	TER	10.15
Environmental	96 A	% DER < TER			61.08
CO ₂ Emissions (t/year)	0.53	DFEE	43.02	TFEE	44.74
Compliance Check	See BREL	% DFEE < TFEE			3.86
% DPER < TPER	22.17	DPER	41.48	TPER	53.29

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	No	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	40.97 m	78.05 m²	2.61 m
	1st Storey:	35.37 m	68.90 m²	2.69 m

8.0 Living Area	15.80	m²
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Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		106.93	83.74	0.00	None	23.19	Enter Gross Area
WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		95.15	85.49	0.00	None	9.66	Enter Gross Area

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	68.90	68.90	None	0.00	Enter Gross Area	0.00
RT03 - Flat Roof	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	9.15	8.07	None	0.00	Enter Gross Area	1.08

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	78.05

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Solid door	Manufacturer	Solid Door				0.63			1.00
Roof Light - Flat	Manufacturer	Roof Light	Double Low-E Soft 0.05			0.63		0.70	1.20

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D001	Solid door	WT01 Brick	North East	2.10	

Summary for Input Data

D002	DG Win	WT01 Brick	South West	5.22
D003	DG Win	WT01 Brick	South West	5.22
W001	DG Win	WT01 Brick	North East	2.72
W002	DG Win	WT01 Brick	North East	2.72
W003	DG Win	WT01 Brick	North West	1.67
W004	DG Win	WT01 Brick	South East	2.72
W005	DG Win	WT01 Brick	South West	0.82
W006	DG Win	WT02 Tile hung	North East	1.50
W007	DG Win	WT02 Tile hung	North East	1.50
W008	DG Win	WT02 Tile hung	North East	1.50
W009	DG Win	WT02 Tile hung	South West	2.17
W010	DG Win	WT02 Tile hung	South West	0.82
W011	DG Win	WT02 Tile hung	South West	2.17
RL01	Roof Light - Flat	RT03 - Flat Roof	South West	1.08

0

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	21.37	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	15.40	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	41.10	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	40.97	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	32.10	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	18.30	0.06	0.06 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.24	0.24 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	17.07	0.06	0.06 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	34.41	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	13.21	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	8.87	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	7.47	0.24	0.24 Table R2	No

Y-value 0.06 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
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

Summary for Input Data

Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Test Method

22.0 Lighting
No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1

Percentage of Heat %

Fuel Type

SAP Code

In Winter

In Summer

Controls SAP Code

Controls description

Is MHS Pumped

Heating Pump Age

Heat Emitter

Underfloor Heating

Flow Temperature

Flow Temperature Value

25.0 Main Heating 2

26.0 Heat Networks

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

Supplementary Immersion

Immersion Only Heating Hot Water

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Summary for Input Data

Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

34.0 Small-scale Hydro

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

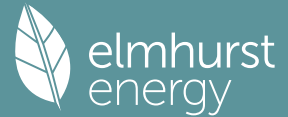
Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT02				Issued on Date	07/05/2026
Assessment Reference	Be Green		Plot Type Ref			
Plot Address					SAP Version	10.2
SAP Rating	81 B	DER	3.95	TER	10.15	
Environmental	96 A	% DER < TER				61.08
CO ₂ Emissions (t/year)	0.53	DFEE	43.02	TFEE	44.74	
Compliance Check	See BREL	% DFEE < TFEE				3.86
% DPER < TPER	22.17	DPER	41.48	TPER	53.29	
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC					

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	78.0500 (1b)	x 2.6100 (2b)	= 203.7105 (1b) - (3b)
First floor	68.9000 (1c)	x 2.6900 (2c)	= 185.3410 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	146.9500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 389.0515 (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)											
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			30.7500	1.1450	35.2099		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof Light - Flat			1.0800	1.1450	1.2366		(27a)
FT01			78.0500	0.1300	10.1465		(28a)
WT01 Brick	106.9300	23.1900	83.7400	0.1800	15.0732		(29a)
WT02 Tile hung	95.1500	9.6600	85.4900	0.1800	15.3882		(29a)
RT01	68.9000		68.9000	0.1100	7.5790		(30)
RT03 - Flat Roof	9.1500	1.0800	8.0700	0.1100	0.8877		(30)
Total net area of external elements Aum(A, m ²)			358.1800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		87.6212		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	

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E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	21.3700	0.0500	1.0685
E3 Sill	15.4000	0.0500	0.7700
E4 Jamb	41.1000	0.0500	2.0550
E5 Ground floor (normal)	40.9700	0.1600	6.5552
E6 Intermediate floor within a dwelling	32.1000	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	18.3000	0.0600	1.0980
E11 Eaves (insulation at rafter level)	0.0000	0.2400	0.0000
E12 Gable (insulation at ceiling level)	17.0700	0.0600	1.0242
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000
E16 Corner (normal)	34.4100	0.0900	3.0969
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	8.8700	0.5600	4.9672
E24 Eaves (insulation at ceiling level - inverted)	7.4700	0.2400	1.7928
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			21.2389 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	108.8601 (37)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)			
(38)m	Jan	Feb	Mar
Heat transfer coeff	34.2232	33.8139	33.4047
Average = Sum(39)m / 12 =	143.0832	142.6740	142.2648
	Apr	May	Jun
	31.3585	30.9493	28.9031
	Jul	Aug	Sep
	28.9031	28.4939	29.7216
	Oct	Nov	Dec
	30.9493	31.7678	32.5862 (38)
	139.8094	140.6278	141.4463 (39)
	140.1163		
HLP	Jan	Feb	Mar
HLP (average)	0.9737	0.9709	0.9681
Days in mont	31	28	31
	Apr	May	Jun
	0.9542	0.9514	0.9375
	Jul	Aug	Sep
	0.9375	0.9347	0.9431
	Oct	Nov	Dec
	0.9514	0.9570	0.9625 (40)
			0.9535
			31

4. Water heating energy requirements (kWh/year)

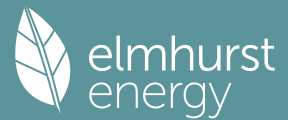
Assumed occupancy												2.9293 (42)
Hot water usage for mixer showers												
Hot water usage for baths	73.3348	72.2327	70.6268	67.5541	65.2865	62.7578	61.3204	62.9142	64.6613	67.3764	70.5151	73.0538 (42a)
Hot water usage for other uses	31.6596	31.1894	30.5273	29.3064	28.3923	27.3786	26.8311	27.4886	28.2045	29.2891	30.5351	31.5526 (42b)
Average daily hot water use (litres/day)	44.6291	43.0062	41.3834	39.7605	38.1376	36.5147	36.5147	38.1376	39.7605	41.3834	43.0062	44.6291 (42c)
												137.5376 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	149.6235	146.4284	142.5374	136.6210	131.8164	126.6511	124.6662	128.5404	132.6263	138.0489	144.0565	149.2355 (44)
Energy content (annual)	236.9671	208.5120	219.0747	187.0273	177.4502	155.7323	150.7730	159.1599	163.5414	187.3311	205.2348	233.6667 (45)
Distribution loss (46)m = 0.15 x (45)m	35.5451	31.2768	32.8612	28.0541	26.6175	23.3598	22.6160	23.8740	24.5312	28.0997	30.7852	35.0500 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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	303.0578	268.2069	285.1655	250.9861	243.5410	219.6911	216.8638	225.2506	227.5002	253.4218	269.1936	299.7575 (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	303.0578	268.2069	285.1655	250.9861	243.5410	219.6911	216.8638	225.2506	227.5002	253.4218	269.1936	299.7575 (64)
12Total per year (kWh/year)												3062.6360 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	131.6642	117.0862	125.7149	113.3536	111.8748	102.9480	103.0046	105.7933	105.5446	115.1602	119.4076	130.5668 (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	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	160.0877	177.2400	160.0877	165.4240	160.0877	165.4240	160.0877	160.0877	165.4240	160.0877	165.4240	160.0877 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	317.1850	320.4764	312.1822	294.5249	272.2356	251.2869	237.2919	234.0005	242.2947	259.9520	282.2412	303.1900 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726 (71)
Water heating gains (Table 5)	176.9679	174.2353	168.9717	157.4356	150.3694	142.9834	138.4471	142.1952	146.5897	154.7852	165.8439	175.4930 (72)
Total internal gains	724.1804	741.8915	711.1814	687.3242	652.6324	626.6340	602.7664	603.2232	621.2480	644.7646	683.4489	708.7104 (73)

6. Solar gains

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[Jan]	Area m2				Solar flux Table 6a W/m2	Specific data or Table 6b	g	Specific data or Table 6c	FF	Access factor Table 6d	Gains W
Northeast	9.9400				11.2829	0.6300		0.7000		0.7700	34.2752 (75)
Southeast	2.7200				36.7938	0.6300		0.7000		0.7700	30.5855 (77)
Southwest	16.4200				36.7938	0.6300		0.7000		0.7700	184.6375 (79)
Northwest	1.6700				11.2829	0.6300		0.7000		0.7700	5.7585 (81)
Southwest	1.0800				26.0000	0.6300		0.7000		1.0000	11.1450 (82)

Solar gains	266.4018	471.2416	689.5737	926.9285	1102.5572	1122.3779	1070.5623	935.6159	771.3273	533.0542	322.3060	225.8814 (83)
Total gains	990.5822	1213.1330	1400.7550	1614.2526	1755.1897	1749.0119	1673.3287	1538.8391	1392.5754	1177.8188	1005.7548	934.5918 (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	71.3212	71.5257	71.7315	72.7782	72.9913	74.0754	74.0754	74.2961	73.6379	72.9913	72.5664	72.1465
alpha	5.7547	5.7684	5.7821	5.8519	5.8661	5.9384	5.9384	5.9531	5.9092	5.8661	5.8378	5.8098
util living area	0.9963	0.9880	0.9631	0.8744	0.7029	0.4998	0.3617	0.4094	0.6614	0.9278	0.9899	0.9973 (86)
MIT	20.1533	20.3249	20.5424	20.7852	20.9094	20.9434	20.9472	20.9468	20.9275	20.7420	20.4029	20.1285 (87)
Th 2	20.1053	20.1077	20.1100	20.1217	20.1240	20.1358	20.1358	20.1381	20.1311	20.1240	20.1193	20.1147 (88)
util rest of house	0.9951	0.9843	0.9521	0.8429	0.6483	0.4342	0.2910	0.3333	0.5881	0.9013	0.9861	0.9965 (89)
MIT 2	19.1108	19.3306	19.6036	19.8987	20.0271	20.0664	20.0685	20.0708	20.0514	19.8594	19.4406	19.0868 (90)
Living area fraction	19.2229	19.4375	19.7046	19.9940	20.1219	20.1607	20.1630	20.1650	20.1456	19.9543	19.5441	19.1988 (92)
MIT	19.2229	19.4375	19.7046	19.9940	20.1219	20.1607	20.1630	20.1650	20.1456	19.9543	19.5441	19.1988 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2229	19.4375	19.7046	19.9940	20.1219	20.1607	20.1630	20.1650	20.1456	19.9543	19.5441	19.1988 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9935	0.9807	0.9460	0.8378	0.6482	0.4362	0.2932	0.3357	0.5894	0.8951	0.9828	0.9952 (94)
Useful gains	984.1546	1189.6833	1325.1414	1352.3959	1137.6312	762.8512	490.6108	516.6191	820.7203	1054.2558	988.5006	930.1084 (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	2135.2143	2074.1200	1878.5448	1555.5869	1177.4665	766.0599	490.8492	517.1399	837.8044	1307.8239	1749.9806	2121.5268 (97)
Space heating kWh	856.3884	594.3415	411.7321	146.2975	29.6374	0.0000	0.0000	0.0000	0.0000	188.6546	548.2656	886.4153 (98a)
Space heating requirement - total per year (kWh/year)												3661.7324
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	856.3884	594.3415	411.7321	146.2975	29.6374	0.0000	0.0000	0.0000	0.0000	188.6546	548.2656	886.4153 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3661.7324
Space heating per m2										(98c) / (4) =		24.9182 (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 %)												249.9000 (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	856.3884	594.3415	411.7321	146.2975	29.6374	0.0000	0.0000	0.0000	0.0000	188.6546	548.2656	886.4153 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)	342.6924	237.8317	164.7587	58.5424	11.8597	0.0000	0.0000	0.0000	0.0000	75.4920	219.3940	354.7080 (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	303.0578	268.2069	285.1655	250.9861	243.5410	219.6911	216.8638	225.2506	227.5002	253.4218	269.1936	299.7575 (64)
Efficiency of water heater	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)
Fuel for water heating, kWh/month	173.0770	153.1736	162.8586	143.3387	139.0868	125.4661	123.8514	128.6411	129.9259	144.7298	153.7371	171.1922 (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	40.0703	36.1925	40.0703	38.7777	40.0703	38.7777	40.0703	40.0703	38.7777	40.0703	38.7777	40.0703 (231)
Lighting	32.5832	26.1394	23.5357	17.2432	13.3192	10.8819	12.1502	15.7933	20.5139	26.9154	30.4008	33.4888 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)	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)	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)	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)	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)

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Annual totals kWh/year	
Space heating fuel - main system 1	1465.2791 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	175.1000
Water heating fuel used	1749.0783 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)	
mechanical ventilation fans (SFP = 0.9940)	471.7950 (230a)
Total electricity for the above, kWh/year	471.7950 (231)
Electricity for lighting (calculated in Appendix L)	262.9650 (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	3949.1173 (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	1465.2791	0.1572	230.2699 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1749.0783	0.1408	246.3577 (264)
Space and water heating			476.6276 (265)
Pumps, fans and electric keep-hot	471.7950	0.1387	65.4438 (267)
Energy for lighting	262.9650	0.1443	37.9540 (268)
Total CO2, kg/year			580.0253 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.9500 (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	1465.2791	1.5818	2317.7137 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1749.0783	1.5208	2660.0153 (278)
Space and water heating			4977.7291 (279)
Pumps, fans and electric keep-hot	471.7950	1.5128	713.7314 (281)
Energy for lighting	262.9650	1.5338	403.3445 (282)
Total Primary energy kWh/year			6094.8050 (286)
Dwelling Primary energy Rate (DPER)			41.4800 (287)

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

CALCULATION OF TARGET EMISSIONS

1. Overall dwelling characteristics

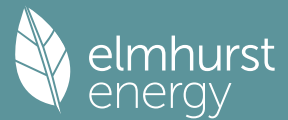
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	78.0500 (1b)	x 2.6100 (2b)	= 203.7105 (1b) - (3b)
First floor	68.9000 (1c)	x 2.6900 (2c)	= 185.3410 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	146.9500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	389.0515 (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	4 * 10 = 40.0000 (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) =	40.0000 / (5) = 0.1028 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3528 (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) = 0.2999 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)

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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												
Effective ac	0.3824	0.3749	0.3674	0.3299	0.3224	0.2849	0.2849	0.2774	0.2999	0.3224	0.3374	0.3524 (22b)
	0.5731	0.5703	0.5675	0.5544	0.5520	0.5406	0.5406	0.5385	0.5450	0.5520	0.5569	0.5621 (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			2.1000	1.0000	2.1000		(26)
TER Opening Type			30.7500	1.1450	35.2099		(27)
TER Roof Light			1.0800	1.5918	2.1838		(27a)
FT01			78.0500	0.1300	10.1465		(28a)
WT01 Brick	106.9300	23.1900	83.7400	0.1800	15.0732		(29a)
WT02 Tile hung	95.1500	9.6600	85.4900	0.1800	15.3882		(29a)
RT01	68.9000		68.9000	0.1100	7.5790		(30)
RT03 - Flat Roof	9.1500	1.0800	8.0700	0.1100	0.8877		(30)
Total net area of external elements Aum(A, m2)			358.1800				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	88.5683	(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	21.3700	0.0500	1.0685
E3 Sill	15.4000	0.0500	0.7700
E4 Jamb	41.1000	0.0500	2.0550
E5 Ground floor (normal)	40.9700	0.1600	6.5552
E6 Intermediate floor within a dwelling	32.1000	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	18.3000	0.0600	1.0980
E11 Eaves (insulation at rafter level)	0.0000	0.0400	0.0000
E12 Gable (insulation at ceiling level)	17.0700	0.0600	1.0242
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000
E16 Corner (normal)	34.4100	0.0900	3.0969
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	8.8700	0.5600	4.9672
E24 Eaves (insulation at ceiling level - inverted)	7.4700	0.2400	1.7928

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

21.2389 (36)

Point Thermal bridges

Total fabric heat loss (33) + (36) + (36a) = 109.8072 (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
	73.5786	73.2142	72.8570	71.1791	70.8652	69.4039	69.4039	69.1332	69.9668	70.8652	71.5003	72.1642 (38)
Heat transfer coeff	183.3859	183.0215	182.6642	180.9864	180.6725	179.2111	179.2111	178.9405	179.7740	180.6725	181.3075	181.9714 (39)
Average = Sum(39)m / 12 =												180.9849

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2479	1.2455	1.2430	1.2316	1.2295	1.2195	1.2195	1.2177	1.2234	1.2295	1.2338	1.2383 (40)
HLP (average)												1.2316
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9293 (42)
Hot water usage for mixer showers												
73.3348	72.2327	70.6268	67.5541	65.2865	62.7578	61.3204	62.9142	64.6613	67.3764	70.5151	73.0538 (42a)	
Hot water usage for baths												
31.6596	31.1894	30.5273	29.3064	28.3923	27.3786	26.8311	27.4886	28.2045	29.2891	30.5351	31.5526 (42b)	
Hot water usage for other uses												
44.6291	43.0062	41.3834	39.7605	38.1376	36.5147	36.5147	38.1376	39.7605	41.3834	43.0062	44.6291 (42c)	
Average daily hot water use (litres/day)												137.5376 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	149.6235	146.4284	142.5374	136.6210	131.8164	126.6511	124.6662	128.5404	132.6263	138.0489	144.0565	149.2355 (44)
Energy conte	236.9671	208.5120	219.0747	187.0273	177.4502	155.7323	150.7730	159.1599	163.5414	187.3311	205.2348	233.6667 (45)
Energy content (annual)										Total = Sum(45)m =		2284.4706

Distribution loss (46)m = 0.15 x (45)m

35.5451 31.2768 32.8612 28.0541 26.6175 23.3598 22.6160 23.8740 24.5312 28.0997 30.7852 35.0500 (46)

Water storage loss (or HIU loss):

Store volume

200.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day):

1.6525 (48)

Temperature factor from Table 2b

0.5400 (49)

Enter (49) or (54) in (55)

0.8924 (55)

Total storage loss

27.6637 24.9865 27.6637 26.7713 27.6637 26.7713 27.6637 27.6637 26.7713 27.6637 26.7713 27.6637 (56)

If cylinder contains dedicated solar storage

27.6637 24.9865 27.6637 26.7713 27.6637 26.7713 27.6637 27.6637 26.7713 27.6637 26.7713 27.6637 (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

287.8931 254.5098 270.0008 236.3106 228.3763 205.0156 201.6991 210.0859 212.8247 238.2571 254.5181 284.5928 (62)

WWHRS

-33.5256 -29.6503 -31.0481 -25.7091 -23.9599 -20.5027 -19.2180 -20.4364 -21.2129 -25.0076 -28.3306 -32.9048 (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

254.3675 224.8594 238.9527 210.6016 204.4164 184.5129 182.4811 189.6495 191.6119 213.2495 226.1875 251.6880 (64)

12Total per year (kWh/year)

Electric shower(s)

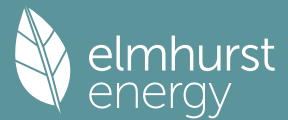
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 (64a)

Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 0.0000 (64a)

Heat gains from water heating, kWh/month

119.5324 106.1284 113.5832 101.6132 99.7431 91.2076 90.8729 93.6615 93.8042 103.0284 107.6672 118.4350 (65)

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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	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	146.4657	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	160.0877	177.2400	160.0877	165.4240	160.0877	165.4240	160.0877	160.0877	165.4240	160.0877	165.4240	160.0877	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	317.1850	320.4764	312.1822	294.5249	272.2356	251.2869	237.2919	234.0005	242.2947	259.9520	282.2412	303.1900	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	37.6466	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	-117.1726	(71)
Water heating gains (Table 5)	160.6618	157.9292	152.6656	141.1295	134.0633	126.6773	122.1410	125.8891	130.2836	138.4791	149.5378	159.1869	(72)
Total internal gains	707.8743	725.5853	694.8752	671.0180	636.3263	610.3279	586.4603	586.9170	604.9419	628.4585	667.1427	692.4043	(73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2		g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				9.9400	11.2829		0.6300		0.7000		0.7700		34.2752 (75)
Southeast				2.7200	36.7938		0.6300		0.7000		0.7700		30.5855 (77)
Southwest				16.4200	36.7938		0.6300		0.7000		0.7700		184.6375 (79)
Northwest				1.6700	11.2829		0.6300		0.7000		0.7700		5.7585 (81)
Southwest				1.0800	26.0000		0.6300		0.7000		1.0000		11.1450 (82)
Solar gains	266.4018	471.2416	689.5737	926.9285	1102.5572	1122.3779	1070.5623	935.6159	771.3273	533.0542	322.3060	225.8814	(83)
Total gains	974.2761	1196.8269	1384.4489	1597.9465	1738.8836	1732.7058	1657.0226	1522.5330	1376.2693	1161.5127	989.4487	918.2857	(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	55.6469	55.7577	55.8668	56.3847	56.4827	56.9432	56.9432	57.0294	56.7649	56.4827	56.2848	56.0795	
alpha	4.7098	4.7172	4.7245	4.7590	4.7655	4.7962	4.7962	4.8020	4.7843	4.7655	4.7523	4.7386	
util living area	0.9969	0.9915	0.9772	0.9279	0.8121	0.6279	0.4687	0.5273	0.7815	0.9588	0.9928	0.9977	(86)
MIT	19.5012	19.7380	20.0705	20.4917	20.8072	20.9575	20.9914	20.9854	20.8813	20.4497	19.8951	19.4629	(87)
Th 2	19.8818	19.8838	19.8857	19.8948	19.8965	19.9044	19.9044	19.9059	19.9014	19.8965	19.8931	19.8895	(88)
util rest of house	0.9958	0.9886	0.9693	0.9033	0.7543	0.5343	0.3557	0.4086	0.6968	0.9396	0.9899	0.9969	(89)
MIT 2	18.1462	18.4493	18.8703	19.3908	19.7403	19.8814	19.9019	19.9010	19.8239	19.3537	18.6576	18.1026	(90)
Living area fraction	18.2919	18.5879	18.9994	19.5091	19.8550	19.9971	20.0190	20.0176	19.9376	19.4715	18.7906	18.2489	(91)
MIT	18.2919	18.5879	18.9994	19.5091	19.8550	19.9971	20.0190	20.0176	19.9376	19.4715	18.7906	18.2489	(92)
Temperature adjustment	18.2919	18.5879	18.9994	19.5091	19.8550	19.9971	20.0190	20.0176	19.9376	19.4715	18.7906	18.2489	(93)
adjusted MIT	18.2919	18.5879	18.9994	19.5091	19.8550	19.9971	20.0190	20.0176	19.9376	19.4715	18.7906	18.2489	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9935	0.9837	0.9607	0.8927	0.7518	0.5426	0.3678	0.4211	0.7000	0.9297	0.9855	0.9950	(94)
Useful gains	967.9336	1177.3722	1330.0704	1426.5628	1307.3756	940.2207	609.4457	641.1683	963.3942	1079.8352	975.1473	913.6745	(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	2565.9162	2505.1711	2283.1843	1920.1114	1473.3883	967.2229	612.7256	647.3356	1049.4432	1602.8444	2119.6017	2556.4910	(97)
Space heating kWh	1188.8990	892.2809	709.1168	355.3550	123.5135	0.0000	0.0000	0.0000	0.0000	389.1188	824.0072	1222.2555	(98a)
Space heating requirement - total per year (kWh/year)												5704.5466	
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	1188.8990	892.2809	709.1168	355.3550	123.5135	0.0000	0.0000	0.0000	0.0000	389.1188	824.0072	1222.2555	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5704.5466	
Space heating per m2										(98c) / (4) =		38.8196	(99)

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

Fraction of space heat from secondary/supplementary system (Table 11)

0.0000 (201)

Efficiency of main space heating system 1 (in %)

1.0000 (202)

Efficiency of main space heating system 2 (in %)

92.3000 (206)

Efficiency of secondary/supplementary heating system, %

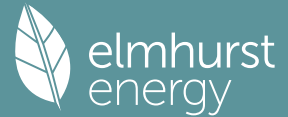
0.0000 (207)

Efficiency of secondary/supplementary heating system, %

0.0000 (208)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1188.8990	892.2809	709.1168	355.3550	123.5135	0.0000	0.0000	0.0000	0.0000	389.1188	824.0072	1222.2555	(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)	1288.0813	966.7182	768.2739	385.0000	133.8174	0.0000	0.0000	0.0000	0.0000	421.5805	892.7488	1324.2204	(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)

Full SAP Calculation Printout



Water heating												
Water heating requirement												
	254.3675	224.8594	238.9527	210.6016	204.4164	184.5129	182.4811	189.6495	191.6119	213.2495	226.1875	251.6880 (64)
Efficiency of water heater												79.8000 (216)
(217)m	87.0693	86.8289	86.3456	85.2233	82.9672	79.8000	79.8000	79.8000	79.8000	85.3906	86.6941	87.1222 (217)
Fuel for water heating, kWh/month												
	292.1437	258.9684	276.7399	247.1172	246.3823	231.2192	228.6731	237.6561	240.1151	249.7341	260.9029	288.8909 (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	33.2631	26.6849	24.0268	17.6030	13.5971	11.1089	12.4037	16.1228	20.9420	27.4770	31.0352	34.1875 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-67.0138	-91.5674	-127.5811	-138.8420	-145.8512	-134.6448	-132.8112	-127.1243	-116.7243	-102.3077	-72.5593	-58.2699 (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	-47.2668	-98.1757	-192.9227	-286.6889	-376.2522	-377.1550	-372.8660	-317.1192	-234.2341	-139.5440	-62.8072	-37.4881 (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												6180.4406 (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												3058.5430 (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)												268.4520 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-3857.8168 (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												5735.6188 (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	6180.4406	0.2100	1297.8925 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3058.5430	0.2100	642.2940 (264)
Space and water heating			1940.1865 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	268.4520	0.1443	38.7459 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1315.2969	0.1353	-177.9467
PV Unit electricity exported	-2542.5199	0.1262	-320.8757
Total			-498.8224 (269)
Total CO2, kg/year			1492.0394 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.1500 (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	6180.4406	1.1300	6983.8978 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3058.5430	1.1300	3456.1536 (278)
Space and water heating			10440.0514 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	268.4520	1.5338	411.7606 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1315.2969	1.5000	-1973.0091
PV Unit electricity exported	-2542.5199	0.4633	-1177.8679
Total			-3150.8770 (283)
Total Primary energy kWh/year			7831.0359 (286)
Target Primary Energy Rate (TPER)			53.2900 (287)

Summary for Input Data



Plot Reference	AT03	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	4.00	TER	10.03
Environmental	96 A	% DER < TER			60.12
CO ₂ Emissions (t/year)	0.5	DFEE	42.27	TFEE	43.71
Compliance Check	See BREL	% DFEE < TFEE			3.30
% DPER < TPER	20.14	DPER	41.99	TPER	52.58

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2026
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Enter TMP value
Thermal Mass	250.00
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor: 1st Storey:	Heat Loss Perimeter 39.63 m 32.18 m	Internal Floor Area 76.25 m² 62.89 m²	Average Storey Height 2.40 m 2.69 m
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8.0 Living Area	15.64	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		181.68	141.44	0.00	None	40.24	Enter Gross Area

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	64.32	64.32	None	0.00	Enter Gross Area	0.00
	RT03 - Flat Roof	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	11.93	10.85	None	0.00	Enter Gross Area	1.08

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	76.25

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof Light - Flat	Manufacturer	Roof Light	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings	Name	Opening Type	Location	Orientation	Area (m²)	Pitch
	D001	Solid door	WT01 Brick	North	2.10	
	D002	DG Win	WT01 Brick	South	5.22	

Summary for Input Data

D004	DG Win	WT01 Brick	South	5.22	
W001	DG Win	WT01 Brick	North	2.72	
W002	DG Win	WT01 Brick	North	2.72	
W003	DG Win	WT01 Brick	East	2.72	
W004	DG Win	WT01 Brick	South East	1.06	
W005	DG Win	WT01 Brick	East	2.86	
W006	DG Win	WT01 Brick	North East	1.06	
W007	DG Win	WT01 Brick	West	1.68	
W008	DG Win	WT01 Brick	North	1.48	
W009	DG Win	WT01 Brick	North	1.48	
W010	DG Win	WT01 Brick	North	1.48	
W011	DG Win	WT01 Brick	East	2.17	
RL01	Roof Light - Flat	RT03 - Flat Roof	South	1.08	0
D003	DG Win	WT01 Brick	South	1.80	
W012	DG Win	WT01 Brick	East	1.48	
W013	DG Win	WT01 Brick	South	2.17	
W014	DG Win	WT01 Brick	South	0.82	

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	26.23	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	19.36	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	53.80	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	39.63	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	28.62	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	16.12	0.06	0.06 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	19.38	0.06	0.06 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	22.76	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	2.40	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	10.26	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	7.76	0.24	0.24 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
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

Summary for Input Data

Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System	No
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22.0 Pressure Testing	Yes	
Designed AP ₅₀	3.00	m ³ /(h.m ²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting	No				
No Fixed Lighting	No				
	Name	Efficacy	Power	Capacity	Count
	LEL	85.00	10.00	850.00	20

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	214	
In Winter	249.90	
In Summer	175.10	
Controls SAP Code	2207	
Controls description	Time and temperature zone control by arrangement	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	35.00	

25.0 Main Heating 2	None
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26.0 Heat Networks	None
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27.0 Secondary Heating	None
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28.0 Water Heating	
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 mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers					
Description	Shower Type	Flow Rate	Rated Power	Connected	Connected To
Mixer shower	Vented hot water system	[l/min] 7.00	[kW]	No	

28.3 Waste Water Heat Recovery System
--

Summary for Input Data

29.0 Hot Water Cylinder

Hot Water Cylinder	
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Cylinder Volume	200.00
Loss	1.72
Pipes insulation	All accessible pipework insulated

L

kWh/day

31.0 Thermal Store

None

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

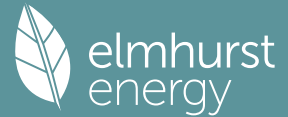
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT03				Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref				
Plot Address					SAP Version	10.2
SAP Rating	81 B	DER	4.00	TER	10.03	
Environmental	96 A	% DER < TER				60.12
CO ₂ Emissions (t/year)	0.5	DFEE	42.27	TFEE	43.71	
Compliance Check	See BREL	% DFEE < TFEE				3.30
% DPER < TPER	20.14	DPER	41.99	TPER	52.58	
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC					

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	76.2500 (1b)	x 2.4000 (2b)	= 183.0000 (1b) - (3b)
First floor	62.8900 (1c)	x 2.6900 (2c)	= 169.1741 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	139.1400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 352.1741 (5)

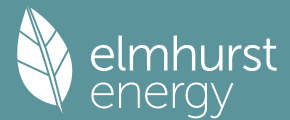
2. Ventilation rate

	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)											
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			38.1400	1.1450	43.6718		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof Light - Flat			1.0800	1.1450	1.2366		(27a)
FT01			76.2500	0.1300	9.9125		(28a)
WT01 Brick	181.6800	40.2400	141.4400	0.1800	25.4592		(29a)
RT01	64.3200		64.3200	0.1100	7.0752		(30)
RT03 - Flat Roof	11.9300	1.0800	10.8500	0.1100	1.1935		(30)
Total net area of external elements Aum (A, m ²)			334.1800				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	90.6488		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				0.0000	0.0500	0.0000	

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E2 Other lintels (including other steel lintels)	26.2300	0.0500	1.3115
E3 Sill	19.3600	0.0500	0.9680
E4 Jamb	53.8000	0.0500	2.6900
E5 Ground floor (normal)	39.6300	0.1600	6.3408
E6 Intermediate floor within a dwelling	28.6200	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	16.1200	0.0600	0.9672
E12 Gable (insulation at ceiling level)	19.3800	0.0600	1.1628
E16 Corner (normal)	22.7600	0.0900	2.0484
E17 Corner (inverted - internal area greater than external area)	2.4000	-0.0900	-0.2160
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	10.2600	0.5600	5.7456
E24 Eaves (insulation at ceiling level - inverted)	7.7600	0.2400	1.8624
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			22.8807 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	113.5295 (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	30.9792	30.6088	30.2383	28.3861	28.0157	26.1635	26.1635	25.7930	26.9043	28.0157	28.7566	29.4974 (38)
Average = Sum(39)m / 12 =	144.5087	144.1383	143.7678	141.9156	141.5452	139.6930	139.6930	139.3225	140.4338	141.5452	142.2861	143.0269 (39)
												141.8230
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0386	1.0359	1.0333	1.0199	1.0173	1.0040	1.0040	1.0013	1.0093	1.0173	1.0226	1.0279 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9154 (42)
Hot water usage for mixer showers	73.1020	72.0034	70.4026	67.3397	65.0793	62.5585	61.1258	62.7145	64.4560	67.1625	70.2913	72.8219	(42a)
Hot water usage for baths	31.5595	31.0908	30.4307	29.2138	28.3025	27.2921	26.7463	27.4017	28.1153	29.1965	30.4386	31.4528	(42b)
Hot water usage for other uses	44.4869	42.8692	41.2515	39.6338	38.0161	36.3984	36.3984	38.0161	39.6338	41.2515	42.8692	44.4869	(42c)
Average daily hot water use (litres/day)													137.1009 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy content (annual)	149.1484	145.9634	142.0848	136.1872	131.3979	126.2490	124.2704	128.1323	132.2052	137.6106	143.5991	148.7617	(44)
Distribution loss (46)m = 0.15 x (45)m	236.2147	207.8500	218.3791	186.4335	176.8868	155.2379	150.2943	158.6545	163.0222	186.7363	204.5832	232.9248	(45)
Water storage loss (or HIU loss):	Total = Sum(45)m =												2277.2172
Store volume	35.4322	31.1775	32.7569	27.9650	26.5330	23.2857	22.5441	23.7982	24.4533	28.0104	30.6875	34.9387	(46)
a) If manufacturer declared loss factor is known (kWh/day):													200.0000 (47)
Temperature factor from Table 2b													1.7200 (48)
Enter (49) or (54) in (55)													0.5400 (49)
Total storage loss													0.9288 (55)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(56)
Primary loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(57)
Combi loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980	(59)
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
WWHRS	302.3054	267.5449	284.4699	250.3923	242.9776	219.1967	216.3851	224.7453	226.9810	252.8270	268.5420	299.0156	(62)
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63a)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)
12Total per year (kWh/year)	302.3054	267.5449	284.4699	250.3923	242.9776	219.1967	216.3851	224.7453	226.9810	252.8270	268.5420	299.0156	(64)
Electric shower(s)	Total per year (kWh/year) = Sum(64)m =												3055.3826 (64)
Heat gains from water heating, kWh/month													0.0000 (64a)
	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)
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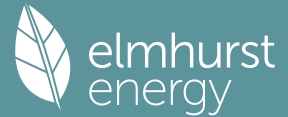
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	155.5686	172.2366	155.5686	160.7542	155.5686	160.7542	155.5686	155.5686	160.7542	155.5686	160.7542	155.5686 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	308.4321	311.6327	303.5674	286.3973	264.7231	244.3525	230.7436	227.5431	235.6084	252.7785	274.4526	294.8233 (68)
Pumps, fans	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172 (71)
Total internal gains	176.6317	173.9078	168.6608	157.1614	150.1176	142.7550	138.2332	141.9694	146.3499	154.5194	165.5430	175.1614 (72)
	710.3638	727.5085	697.5282	674.0443	640.1407	614.5932	591.2768	591.8125	609.4439	632.5979	670.4813	695.2847 (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
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North	9.8800	10.6334	0.6300	0.7000	0.7700	32.1071 (74)
Northeast	1.0600	11.2829	0.6300	0.7000	0.7700	3.6551 (75)
East	9.2300	19.6403	0.6300	0.7000	0.7700	55.4014 (76)
Southeast	1.0600	36.7938	0.6300	0.7000	0.7700	11.9194 (77)
South	15.2300	46.7521	0.6300	0.7000	0.7700	217.6068 (78)
West	1.6800	19.6403	0.6300	0.7000	0.7700	10.0839 (80)
South	1.0800	26.0000	0.6300	0.7000	1.0000	11.1450 (82)

Solar gains	341.9186	596.7357	851.5350	1108.9731	1287.7909	1297.6147	1243.1448	1107.4368	940.6549	669.2603	412.2202	290.8374 (83)
Total gains	1052.2825	1324.2442	1549.0632	1783.0174	1927.9316	1912.2079	1834.4216	1699.2493	1550.0988	1301.8582	1082.7015	986.1222 (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	66.8645	67.0363	67.2091	68.0862	68.2644	69.1696	69.1696	69.3535	68.8046	68.2644	67.9090	67.5572
alpha	5.4576	5.4691	5.4806	5.5391	5.5510	5.6113	5.6113	5.6236	5.5870	5.5510	5.5273	5.5038
util living area	0.9939	0.9795	0.9409	0.8307	0.6544	0.4640	0.3346	0.3762	0.6073	0.8943	0.9835	0.9956 (86)
MIT	20.1367	20.3393	20.5732	20.8043	20.9117	20.9407	20.9442	20.9439	20.9281	20.7618	20.4038	20.1039 (87)
Th 2	20.0513	20.0535	20.0557	20.0667	20.0690	20.0800	20.0800	20.0822	20.0756	20.0690	20.0645	20.0601 (88)
util rest of house	0.9920	0.9735	0.9247	0.7931	0.5979	0.3989	0.2649	0.3017	0.5332	0.8594	0.9776	0.9942 (89)
MIT 2	19.0457	19.3030	19.5919	19.8653	19.9730	20.0070	20.0089	20.0111	19.9947	19.8290	19.3957	19.0111 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.1684	19.4195	19.7022	19.9708	20.0785	20.1120	20.1141	20.1160	20.0996	19.9338	19.5090	19.1339 (92)
Temperature adjustment	0.0000											
adjusted MIT	19.1684	19.4195	19.7022	19.9708	20.0785	20.1120	20.1141	20.1160	20.0996	19.9338	19.5090	19.1339 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9895	0.9683	0.9175	0.7888	0.5985	0.4012	0.2675	0.3044	0.5352	0.8535	0.9730	0.9923 (94)
Useful gains	1041.2605	1282.2717	1421.2809	1406.4982	1153.8528	767.1856	490.6685	517.2682	829.5560	1111.1564	1053.4425	978.5291 (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	2148.6068	2092.8118	1898.0475	1571.1223	1185.9410	769.9846	490.8889	517.7188	842.5475	1321.1593	1765.6335	2135.9544 (97)
Space heating kWh	823.8656	544.6829	354.7143	118.5293	23.8736	0.0000	0.0000	0.0000	0.0000	156.2422	512.7775	861.1244 (98a)
Space heating requirement - total per year (kWh/year)	3395.8099											
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	823.8656	544.6829	354.7143	118.5293	23.8736	0.0000	0.0000	0.0000	0.0000	156.2422	512.7775	861.1244 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)	3395.8099											
Space heating per m2	(98c) / (4) = 24.4057 (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 %)	249.9000 (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	823.8656	544.6829	354.7143	118.5293	23.8736	0.0000	0.0000	0.0000	0.0000	156.2422	512.7775	861.1244 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)	329.6781	217.9603	141.9425	47.4307	9.5533	0.0000	0.0000	0.0000	0.0000	62.5219	205.1931	344.5876 (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	302.3054	267.5449	284.4699	250.3923	242.9776	219.1967	216.3851	224.7453	226.9810	252.8270	268.5420	299.0156 (64)
Efficiency of water heater (217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)
Fuel for water heating, kWh/month	172.6473	152.7955	162.4614	142.9996	138.7650	125.1837	123.5780	128.3525	129.6293	144.3901	153.3649	170.7684 (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	36.2721	32.7619	36.2721	35.1020	36.2721	35.1020	36.2721	36.2721	35.1020	36.2721	35.1020	36.2721 (231)
Lighting	31.6634	25.4015	22.8713	16.7565	12.9432	10.5747	11.8072	15.3475	19.9348	26.1556	29.5427	32.5434 (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												

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Space heating fuel - main system 1	1358.8675 (211)
Space heating fuel - main system 2	0.0000 (213)
Space heating fuel - secondary	0.0000 (215)
Efficiency of water heater	175.1000
Water heating fuel used	1744.9358 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans:	
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)	
mechanical ventilation fans (SFP = 0.9940)	427.0745 (230a)
Total electricity for the above, kWh/year	427.0745 (231)
Electricity for lighting (calculated in Appendix L)	255.5417 (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	3786.4195 (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	1358.8675	0.1575	214.0269 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	1744.9358	0.1408	245.7712 (264)
Space and water heating			459.7981 (265)
Pumps, fans and electric keep-hot	427.0745	0.1387	59.2405 (267)
Energy for lighting	255.5417	0.1443	36.8826 (268)
Total CO2, kg/year			555.9212 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.0000 (273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	1358.8675	1.5830	2151.1380 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	1744.9358	1.5208	2653.7042 (278)
Space and water heating			4804.8422 (279)
Pumps, fans and electric keep-hot	427.0745	1.5128	646.0783 (281)
Energy for lighting	255.5417	1.5338	391.9584 (282)
Total Primary energy kWh/year			5842.8788 (286)
Dwelling Primary energy Rate (DPER)			41.9900 (287)

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

1. Overall dwelling characteristics

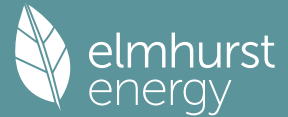
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling			
Ground floor	76.2500 (1b)	x 2.4000 (2b)	= 183.0000 (1b) - (3b)
First floor	62.8900 (1c)	x 2.6900 (2c)	= 169.1741 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	139.1400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 352.1741 (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	4 * 10 = 40.0000 (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) =	40.0000 / (5) = 0.1136 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3636 (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) = 0.3090 (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)

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Adj infilt rate	0.3940	0.3863	0.3786	0.3399	0.3322	0.2936	0.2936	0.2859	0.3090	0.3322	0.3477	0.3631 (22b)
Effective ac	0.5776	0.5746	0.5717	0.5578	0.5552	0.5431	0.5431	0.5409	0.5478	0.5552	0.5604	0.5659 (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			2.1000	1.0000	2.1000		(26)
TER Opening Type			31.7700	1.1450	36.3779		(27)
TER Roof Light			0.9000	1.5918	1.8199		(27a)
FT01			76.2500	0.1300	9.9125		(28a)
WT01 Brick	181.6800	33.8700	147.8100	0.1800	26.6058		(29a)
RT01	64.3200		64.3200	0.1100	7.0752		(30)
RT03 - Flat Roof	11.9300	0.9000	11.0300	0.1100	1.2133		(30)
Total net area of external elements Aum(A, m2)			334.1800				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		85.1045		(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	26.2300	0.0500	1.3115
E3 Sill	19.3600	0.0500	0.9680
E4 Jamb	53.8000	0.0500	2.6900
E5 Ground floor (normal)	39.6300	0.1600	6.3408
E6 Intermediate floor within a dwelling	28.6200	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	16.1200	0.0600	0.9672
E12 Gable (insulation at ceiling level)	19.3800	0.0600	1.1628
E16 Corner (normal)	22.7600	0.0900	2.0484
E17 Corner (inverted - internal area greater than external area)	2.4000	-0.0900	-0.2160
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	10.2600	0.5600	5.7456
E24 Eaves (insulation at ceiling level - inverted)	7.7600	0.2400	1.8624
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			22.8807 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 107.9852 (37)

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

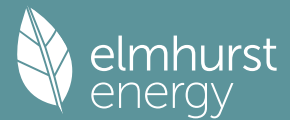
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	67.1307	66.7803	66.4369	64.8240	64.5222	63.1174	63.1174	62.8573	63.6586	64.5222	65.1327	65.7710 (38)
Average = Sum(39)m / 12 =	175.1159	174.7656	174.4222	172.8092	172.5075	171.1027	171.1027	170.8425	171.6438	172.5075	173.1179	173.7562 (39)
												172.8078
HLP	1.2586	1.2560	1.2536	1.2420	1.2398	1.2297	1.2297	1.2278	1.2336	1.2398	1.2442	1.2488 (40)
HLP (average)												1.2420
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9154 (42)
Hot water usage for mixer showers													
73.1020	72.0034	70.4026	67.3397	65.0793	62.5585	61.1258	62.7145	64.4560	67.1625	70.2913	72.8219	(42a)	
Hot water usage for baths													
31.5595	31.0908	30.4307	29.2138	28.3025	27.2921	26.7463	27.4017	28.1153	29.1965	30.4386	31.4528	(42b)	
Hot water usage for other uses													
44.4869	42.8692	41.2515	39.6338	38.0161	36.3984	36.3984	38.0161	39.6338	41.2515	42.8692	44.4869	(42c)	
Average daily hot water use (litres/day)												137.1009 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	149.1484	145.9634	142.0848	136.1872	131.3979	126.2490	124.2704	128.1323	132.2052	137.6106	143.5991	148.7617 (44)	
Energy content (annual)	236.2147	207.8500	218.3791	186.4335	176.8868	155.2379	150.2943	158.6545	163.0222	186.7363	204.5832	232.9248 (45)	
Distribution loss (46)m = 0.15 x (45)m										Total = Sum(45)m =		2277.2172	
35.4322	31.1775	32.7569	27.9650	26.5330	23.2857	22.5441	23.7982	24.4533	28.0104	30.6875	34.9387 (46)		
Water storage loss (or HIU loss):													
Store volume												200.0000 (47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.6525 (48)	
Temperature factor from Table 2b												0.5400 (49)	
Enter (49) or (54) in (55)												0.8924 (55)	
Total storage loss	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (56)	
If cylinder contains dedicated solar storage													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (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													
287.1407	253.8477	269.3052	235.7168	227.8129	204.5212	201.2204	209.5806	212.3055	237.6623	253.8665	283.8509 (62)		
WWHRS	-33.4192	-29.5562	-30.9496	-25.6275	-23.8839	-20.4376	-19.1570	-20.3715	-21.1455	-24.9282	-28.2407	-32.8003 (63a)	
PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)	
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)	
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)	
Output from w/h	253.7215	224.2915	238.3556	210.0894	203.9290	184.0836	182.0634	189.2091	191.1600	212.7341	225.6258	251.0506 (64)	
12Total per year (kWh/year)												2566.3135 (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	119.2822	105.9083	113.3519	101.4158	99.5557	91.0432	90.7137	93.4935	93.6315	102.8307	107.4505	118.1884 (65)	

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

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Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	145.7715	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	155.5686	172.2366	155.5686	160.7542	155.5686	160.7542	155.5686	155.5686	160.7542	155.5686	160.7542	155.5686	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	308.4321	311.6327	303.5674	286.3973	264.7231	244.3525	230.7436	227.5431	235.6084	252.7785	274.4526	294.8233	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	37.5772	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	-116.6172	(71)
Water heating gains (Table 5)	160.3256	157.6017	152.3547	140.8552	133.8115	126.4489	121.9270	125.6633	130.0438	138.2133	149.2369	158.8553	(72)
Total internal gains	694.0577	711.2024	681.2221	657.7382	623.8346	598.2871	574.9707	575.5064	593.1378	616.2918	654.1752	678.9786	(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	
North					8.2300	10.6334		0.6300	0.7000		0.7700	26.7451 (74)	
Northeast					0.8800	11.2829		0.6300	0.7000		0.7700	3.0344 (75)	
East					7.6900	19.6403		0.6300	0.7000		0.7700	46.1578 (76)	
Southeast					0.8800	36.7938		0.6300	0.7000		0.7700	9.8953 (77)	
South					12.6900	46.7521		0.6300	0.7000		0.7700	181.3152 (78)	
West					1.4000	19.6403		0.6300	0.7000		0.7700	8.4032 (80)	
South					0.9000	26.0000		0.6300	0.7000		1.0000	9.2875 (82)	
Solar gains	284.8386	497.1132	709.3659	923.8071	1072.7525	1080.9293	1035.5579	922.5216	783.6014	557.5278	343.4034	242.2852	(83)
Total gains	978.8963	1208.3156	1390.5880	1581.5453	1696.5872	1679.2163	1610.5286	1498.0280	1376.7393	1173.8196	997.5786	921.2638	(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	55.1777	55.2884	55.3972	55.9143	56.0121	56.4719	56.4719	56.5579	56.2939	56.0121	55.8145	55.6095	
alpha	4.6785	4.6859	4.6931	4.7276	4.7341	4.7648	4.7648	4.7705	4.7529	4.7341	4.7210	4.7073	
util living area	0.9960	0.9890	0.9719	0.9184	0.8017	0.6198	0.4607	0.5128	0.7588	0.9491	0.9908	0.9970	(86)
MIT	19.5272	19.7766	20.1095	20.5162	20.8150	20.9588	20.9918	20.9866	20.8940	20.4846	19.9260	19.4859	(87)
Th 2	19.8734	19.8754	19.8774	19.8866	19.8883	19.8963	19.8963	19.8978	19.8932	19.8883	19.8848	19.8812	(88)
util rest of house	0.9947	0.9854	0.9624	0.8915	0.7425	0.5261	0.3487	0.3959	0.6718	0.9263	0.9871	0.9960	(89)
MIT 2	18.1736	18.4919	18.9120	19.4115	19.7397	19.8742	19.8939	19.8934	19.8255	19.3874	18.6907	18.1262	(90)
Living area fraction									fLA = Living area / (4) =			0.1124	(91)
MIT	18.3257	18.6363	19.0466	19.5356	19.8606	19.9961	20.0173	20.0163	19.9456	19.5107	18.8296	18.2790	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3257	18.6363	19.0466	19.5356	19.8606	19.9961	20.0173	20.0163	19.9456	19.5107	18.8296	18.2790	(93)

8. Space heating requirement

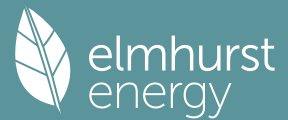
Utilisation	0.9918	0.9797	0.9530	0.8812	0.7409	0.5350	0.3612	0.4089	0.6764	0.9162	0.9819	0.9937	(94)
Useful gains	970.8952	1183.7676	1325.2859	1393.6303	1256.9884	898.4517	581.7184	612.4747	931.1693	1075.4689	979.5615	915.4521	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	2456.1271	2400.6372	2188.3995	1837.9374	1407.7591	923.2822	584.7083	617.8144	1003.3633	1537.1675	2030.6007	2446.3205	(97)
Space heating kWh	1105.0125	817.7364	642.1565	319.9011	112.1734	0.0000	0.0000	0.0000	0.0000	343.5037	756.7483	1138.9661	(98a)
Space heating requirement - total per year (kWh/year)												5236.1981	
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	1105.0125	817.7364	642.1565	319.9011	112.1734	0.0000	0.0000	0.0000	0.0000	343.5037	756.7483	1138.9661	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5236.1981	
Space heating per m2										(98c) / (4) =		37.6326	(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	1105.0125	817.7364	642.1565	319.9011	112.1734	0.0000	0.0000	0.0000	0.0000	343.5037	756.7483	1138.9661	(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)	1197.1967	885.9550	695.7276	346.5884	121.5313	0.0000	0.0000	0.0000	0.0000	372.1600	819.8789	1233.9827	(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

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Efficiency of water heater (217)m	253.7215	224.2915	238.3556	210.0894	203.9290	184.0836	182.0634	189.2091	191.1600	212.7341	225.6258	251.0506 (64)
Fuel for water heating, kWh/month	86.9684	86.6954	86.1692	84.9999	82.7772	79.8000	79.8000	79.8000	79.8000	85.1281	86.5579	79.8000 (216)
Space cooling fuel requirement (221)m	291.7398	258.7121	276.6134	247.1642	246.3591	230.6812	228.1496	237.1041	239.5488	249.8988	260.6646	288.4733 (219)
Pumps and Fa	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)
Lighting	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)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	32.3241	25.9316	23.3485	17.1061	13.2133	10.7953	12.0536	15.6677	20.3508	26.7013	30.1591	33.2225 (232)
Electricity generated by wind turbines (Appendix M) (negative quantity) (234a)m	-65.4148	-89.3561	-124.4676	-135.4235	-142.2442	-131.3193	-129.5401	-124.0052	-113.8735	-99.8319	-70.8223	-56.8836 (233a)
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 (234a)
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 (235a)
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 (235c)
Electricity generated by wind turbines (Appendix M) (negative quantity) (234b)m	-46.2302	-96.0111	-188.6447	-280.2938	-367.8184	-368.6773	-364.4752	-309.9930	-228.9910	-136.4422	-61.4224	-36.6660 (233b)
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 (234b)
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 (235b)
Annual totals kWh/year												
Space heating fuel - main system 1												5673.0207 (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												3055.1090 (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)												260.8738 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-3768.8473 (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												5306.1563 (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	5673.0207	0.2100	1191.3343 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3055.1090	0.2100	641.5729 (264)
Space and water heating			1832.9072 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	260.8738	0.1443	37.6522 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1283.1821	0.1353	-173.6067
PV Unit electricity exported	-2485.6652	0.1262	-313.7120
Total			-487.3187 (269)
Total CO2, kg/year			1395.1699 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.0300 (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	5673.0207	1.1300	6410.5134 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3055.1090	1.1300	3452.2732 (278)
Space and water heating			9862.7866 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	260.8738	1.5338	400.1370 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1283.1821	1.5001	-1924.8533
PV Unit electricity exported	-2485.6652	0.4633	-1151.5724
Total			-3076.4257 (283)
Total Primary energy kWh/year			7316.5986 (286)
Target Primary Energy Rate (TPER)			52.5800 (287)

Summary for Input Data



Plot Reference	AT04	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.47	TER	11.44
Environmental	96 A	% DER < TER			60.93
CO ₂ Emissions (t/year)	0.39	DFEE	38.17	TFEE	39.70
Compliance Check	See BREL	% DFEE < TFEE			3.85
% DPER < TPER	20.89	DPER	47.34	TPER	59.84

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	28.90 m	46.52 m ²	2.40 m
	1st Storey:	28.93 m	46.52 m ²	2.69 m

8.0 Living Area	17.10	m ²
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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
WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		56.88	47.24	0.00	None	9.64	Enter Gross Area
WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		77.82	72.69	0.00	None	5.13	Enter Gross Area

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
RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	46.52	46.52	None	0.00	Enter Gross Area	0.00

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	46.52

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Solid door	Manufacturer	Solid Door				0.63			1.00

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	East	2.10	
D002	DG Win	WT01 Brick	West	5.22	
W001	DG Win	WT01 Brick	East	0.82	
W002	DG Win	WT01 Brick	West	1.50	

Summary for Input Data

W003	DG Win	WT02 Tile hung	East	2.17
W004	DG Win	WT02 Tile hung	West	1.48
W005	DG Win	WT02 Tile hung	West	1.48

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	9.70	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	6.22	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	20.40	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	28.93	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	28.93	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	19.28	0.06	0.06 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	9.64	0.06	0.06 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	20.36	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	0.00	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	0.00	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	0.00	0.24	0.24 Table R2	No

Y-value	0.04	W/m²K
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19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
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

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa
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Summary for Input Data

Test Method	Blower Door				
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22.0 Lighting

No Fixed Lighting	No				
	Name LEL	Efficacy 85.00	Power 10.00	Capacity 850.00	Count 20

24.0 Main Heating 1

	SAP table				
Percentage of Heat	100.00				%
Fuel Type	Electricity				
SAP Code	214				
In Winter	249.90				
In Summer	175.10				
Controls SAP Code	2207				
Controls description	Time and temperature zone control by arrangement				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators and Underfloor				
Underfloor Heating	Yes - Pipes in thin screed				
Flow Temperature	Enter value				
Flow Temperature Value	35.00				

25.0 Main Heating 2

	None				
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26.0 Heat Networks

	None				
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27.0 Secondary Heating

	None				
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28.0 Water Heating

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 mains				
Bath Count	1				
Supplementary Immersion	No				
Immersion Only Heating Hot Water	No				

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

	Hot Water Cylinder				
Cylinder Stat	Yes				
Cylinder In Heated Space	Yes				
Independent Time Control	Yes				
Insulation Type	Measured Loss				
Cylinder Volume	200.00				L
Loss	1.72				kWh/day
Pipes insulation	All accessible pipework insulated				

Summary for Input Data



31.0 Thermal Store

None

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

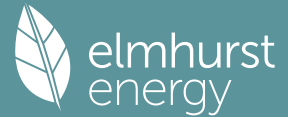
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT04				Issued on Date	07/05/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	80 C		DER	4.47		TER	11.44
Environmental	96 A		% DER < TER				60.93
CO ₂ Emissions (t/year)	0.39		DFEE	38.17		TFEE	39.70
Compliance Check	See BREL		% DFEE < TFEE				3.85
% DPER < TPER	20.89		DPER	47.34		TPER	59.84
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	46.5200 (1b)	x 2.4000 (2b)	= 111.6480 (1b) - (3b)
First floor	46.5200 (1c)	x 2.6900 (2c)	= 125.1388 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0400		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 236.7868 (5)

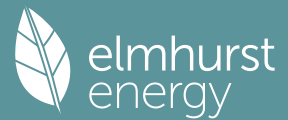
2. Ventilation rate

	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)											
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	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) =	79.2000 (23c)											
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			12.6700	1.1450	14.5076		(27)
Solid door			2.1000	1.0000	2.1000		(26)
FT01			46.5200	0.1300	6.0476		(28a)
WT01 Brick	56.8800	9.6400	47.2400	0.1800	8.5032		(29a)
WT02 Tile hung	77.8200	5.1300	72.6900	0.1800	13.0842		(29a)
RT01	46.5200		46.5200	0.1100	5.1172		(30)
Total net area of external elements A _{um} (A, m ²)			227.7400				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		49.3598		(33)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)				9.7000	0.0500	0.4850	

Full SAP Calculation Printout



E3 Sill	6.2200	0.0500	0.3110
E4 Jamb	20.4000	0.0500	1.0200
E5 Ground floor (normal)	28.9300	0.1600	4.6288
E6 Intermediate floor within a dwelling	28.9300	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	19.2800	0.0600	1.1568
E12 Gable (insulation at ceiling level)	9.6400	0.0600	0.5784
E16 Corner (normal)	20.3600	0.0900	1.8324
E17 Corner (inverted - internal area greater than external area)	0.0000	-0.0900	-0.0000
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	0.0000	0.5600	0.0000
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.2400	0.0000
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			10.0124 (36)
Point Thermal bridges			0.0000
Total fabric heat loss	(33) + (36) + (36a) =		59.3722 (37)

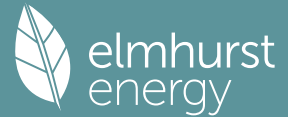
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	20.8291	20.5800	20.3310	19.0856	18.8365	17.5912	17.5912	17.3421	18.0893	18.8365	19.3347	19.8328	(38)
Average = Sum(39)m / 12 =	80.2013	79.9523	79.7032	78.4578	78.2088	76.9634	76.9634	76.7144	77.4616	78.2088	78.7069	79.2051	(39)
												78.3956	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.8620	0.8593	0.8567	0.8433	0.8406	0.8272	0.8272	0.8245	0.8326	0.8406	0.8459	0.8513	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	
												0.8426	
												31	

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.6651 (42)
Hot water usage for mixer showers	68.9045	67.8690	66.3601	63.4730	61.3424	58.9664	57.6159	59.1134	60.7550	63.3061	66.2551	68.6405 (42a)
Hot water usage for baths	29.7544	29.3125	28.6902	27.5429	26.6837	25.7311	25.2165	25.8344	26.5072	27.5266	28.6976	29.6538 (42b)
Hot water usage for other uses	41.9232	40.3987	38.8742	37.3497	35.8252	34.3008	34.3008	35.8252	37.3497	38.8742	40.3987	41.9232 (42c)
Average daily hot water use (litres/day)												129.2266 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy content (annual)	140.5821	137.5802	133.9245	128.3656	123.8514	118.9983	117.1332	120.7731	124.6119	129.7069	135.3514	140.2175 (44)
Distribution loss (46)m = 0.15 x (45)m	222.6476	195.9124	205.8370	175.7261	166.7278	146.3223	141.6624	149.5423	153.6590	176.0110	192.8329	219.5467 (45)
Water storage loss (or HIU loss):	33.3971	29.3869	30.8755	26.3589	25.0092	21.9483	21.2494	22.4313	23.0488	26.4017	28.9249	32.9320 (46)
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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	288.7384	255.6072	271.9277	239.6849	232.8186	210.2811	207.7532	215.6331	217.6178	242.1018	256.7917	285.6374 (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	288.7384	255.6072	271.9277	239.6849	232.8186	210.2811	207.7532	215.6331	217.6178	242.1018	256.7917	285.6374 (64)
12Total per year (kWh/year)												2924.5929 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	126.9029	112.8968	121.3134	109.5960	108.3096	99.8192	99.9754	102.5954	102.2586	111.3963	115.2840	125.8719 (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	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	133.1380	147.4027	133.1380	137.5759	133.1380	137.5759	133.1380	133.1380	137.5759	133.1380	137.5759	133.1380 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	244.5607	247.0985	240.7034	227.0889	209.9032	193.7510	182.9603	180.4225	186.8176	200.4321	217.6178	233.7700 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035 (71)
Water heating gains (Table 5)	170.5685	168.0011	163.0557	152.2166	145.5774	138.6378	134.3755	137.8971	142.0259	149.7262	160.1167	169.1826 (72)
Total internal gains	614.2434	628.4787	602.8733	582.8577	554.5948	532.9409	513.4500	514.4339	529.3957	549.2725	581.2867	602.0669 (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	

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East	2.9900		19.6403		0.6300		0.7000		0.7700		17.9469 (76)	
West	9.6800		19.6403		0.6300		0.7000		0.7700		58.1025 (80)	

Solar gains	76.0494	148.7687	245.0009	357.3193	437.9082	448.2769	426.7779	366.5959	284.9462	176.5267	94.8247	62.5393 (83)
Total gains	690.2928	777.2474	847.8742	940.1770	992.5030	981.2178	940.2279	881.0298	814.3419	725.7991	676.1113	664.6063 (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	80.5611	80.8121	81.0646	82.3514	82.6136	83.9504	83.9504	84.2230	83.4105	82.6136	82.0908	81.5745
alpha	6.3707	6.3875	6.4043	6.4901	6.5076	6.5967	6.5967	6.6149	6.5607	6.5076	6.4727	6.4383
util living area	0.9928	0.9838	0.9592	0.8707	0.7042	0.4993	0.3599	0.4000	0.6415	0.9108	0.9826	0.9942 (86)
MIT	20.3548	20.4746	20.6389	20.8324	20.9262	20.9505	20.9527	20.9526	20.9415	20.8127	20.5589	20.3396 (87)
Th 2	20.1999	20.2022	20.2045	20.2160	20.2183	20.2298	20.2298	20.2321	20.2252	20.2183	20.2137	20.2091 (88)
util rest of house	0.9907	0.9792	0.9478	0.8404	0.6539	0.4405	0.2971	0.3335	0.5755	0.8818	0.9767	0.9925 (89)
MIT 2	19.4454	19.5984	19.8041	20.0398	20.1368	20.1681	20.1693	20.1717	20.1576	20.0251	19.7157	19.4338 (90)
Living area fraction									fLA = Living area / (4) =			0.1838 (91)
MIT	19.6125	19.7594	19.9575	20.1855	20.2819	20.3119	20.3133	20.3152	20.3017	20.1699	19.8707	19.6003 (92)
Temperature adjustment												0.0000
adjusted MIT	19.6125	19.7594	19.9575	20.1855	20.2819	20.3119	20.3133	20.3152	20.3017	20.1699	19.8707	19.6003 (93)

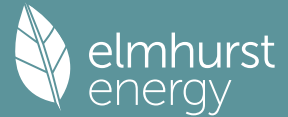
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9887	0.9760	0.9436	0.8391	0.6581	0.4468	0.3039	0.3407	0.5822	0.8797	0.9735	0.9908 (94)
Useful gains	682.4810	758.5564	800.0823	788.9320	653.1840	438.3871	285.7087	300.1916	474.0986	638.5131	658.1886	658.4743 (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	1228.0850	1188.0464	1072.6093	885.4365	671.1773	439.6051	285.7858	300.3520	480.3905	748.4500	1005.1397	1219.7783 (97)
Space heating kWh	405.9294	288.6173	202.7601	69.4833	13.3871	0.0000	0.0000	0.0000	0.0000	81.7930	249.8048	417.6101 (98a)
Space heating requirement - total per year (kWh/year)												1729.3851
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	405.9294	288.6173	202.7601	69.4833	13.3871	0.0000	0.0000	0.0000	0.0000	81.7930	249.8048	417.6101 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1729.3851
Space heating per m2										(98c) / (4) =		18.5875 (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 %)												249.9000 (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	405.9294	288.6173	202.7601	69.4833	13.3871	0.0000	0.0000	0.0000	0.0000	81.7930	249.8048	417.6101 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)	162.4367	115.4931	81.1365	27.8044	5.3570	0.0000	0.0000	0.0000	0.0000	32.7303	99.9619	167.1109 (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	288.7384	255.6072	271.9277	239.6849	232.8186	210.2811	207.7532	215.6331	217.6178	242.1018	256.7917	285.6374 (64)
Efficiency of water heater (217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)
Fuel for water heating, kWh/month	164.8991	145.9779	155.2985	136.8846	132.9632	120.0920	118.6483	123.1485	124.2820	138.2649	146.6543	163.1282 (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	24.3878	22.0277	24.3878	23.6011	24.3878	23.6011	24.3878	24.3878	23.6011	24.3878	23.6011	24.3878 (231)
Lighting	27.0980	21.7390	19.5736	14.3404	11.0770	9.0500	10.1048	13.1346	17.0605	22.3843	25.2831	27.8511 (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												692.0308 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												175.1000
Water heating fuel used												1670.2415 (219)
Space cooling fuel												0.0000 (221)

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Electricity for pumps and fans:		
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)		
mechanical ventilation fans (SFP = 0.9940)	287.1466	(230a)
Total electricity for the above, kWh/year	287.1466	(231)
Electricity for lighting (calculated in Appendix L)	218.6965	(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	2868.1154	(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	692.0308	0.1573	108.8378	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1670.2415	0.1408	235.1961	(264)
Space and water heating			344.0339	(265)
Pumps, fans and electric keep-hot	287.1466	0.1387	39.8308	(267)
Energy for lighting	218.6965	0.1443	31.5647	(268)
Total CO2, kg/year			415.4293	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.4700	(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	692.0308	1.5822	1094.9457	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1670.2415	1.5207	2539.9045	(278)
Space and water heating			3634.8502	(279)
Pumps, fans and electric keep-hot	287.1466	1.5128	434.3954	(281)
Energy for lighting	218.6965	1.5338	335.4439	(282)
Total Primary energy kWh/year			4404.6896	(286)
Dwelling Primary energy Rate (DPER)			47.3400	(287)

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

1. Overall dwelling characteristics

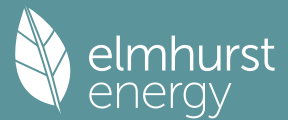
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	46.5200 (1b)	x 2.4000 (2b)	= 111.6480 (1b) - (3b)	
First floor	46.5200 (1c)	x 2.6900 (2c)	= 125.1388 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	93.0400		(4)	
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	236.7868 (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) =	0.1267 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3767	(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) =	0.3202 (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	0.4082	0.4002	0.3922	0.3522	0.3442	0.3042	0.3042	0.2962	0.3202	0.3442	0.3602	0.3762 (22b)
Effective ac	0.5833	0.5801	0.5769	0.5620	0.5592	0.5463	0.5463	0.5439	0.5513	0.5592	0.5649	0.5708 (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			2.1000	1.0000	2.1000			(26)
TER Opening Type			12.6700	1.1450	14.5076			(27)
FT01			46.5200	0.1300	6.0476			(28a)
WT01 Brick	56.8800	9.6400	47.2400	0.1800	8.5032			(29a)
WT02 Tile hung	77.8200	5.1300	72.6900	0.1800	13.0842			(29a)
RT01	46.5200		46.5200	0.1100	5.1172			(30)
Total net area of external elements Aum(A, m2)			227.7400					(31)
Fabric heat loss, W/K = Sum (A x U)					49.3598			(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	9.7000	0.0500	0.4850	
E3 Sill	6.2200	0.0500	0.3110	
E4 Jamb	20.4000	0.0500	1.0200	
E5 Ground floor (normal)	28.9300	0.1600	4.6288	
E6 Intermediate floor within a dwelling	28.9300	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	19.2800	0.0600	1.1568	
E12 Gable (insulation at ceiling level)	9.6400	0.0600	0.5784	
E16 Corner (normal)	20.3600	0.0900	1.8324	
E17 Corner (inverted - internal area greater than external area)	0.0000	-0.0900	-0.0000	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	0.0000	0.5600	0.0000	
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.2400	0.0000	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				10.0124 (36)
Point Thermal bridges				0.0000 (36a)
Total fabric heat loss				59.3722 (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	45.5813	45.3285	45.0806	43.9165	43.6987	42.6848	42.6848	42.4971	43.0754	43.6987	44.1393	44.6000	(38)
Heat transfer coeff	104.9536	104.7007	104.4529	103.2888	103.0710	102.0571	102.0571	101.8693	102.4476	103.0710	103.5116	103.9722	(39)
Average = Sum(39)m / 12 =												103.2877	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1280	1.1253	1.1227	1.1102	1.1078	1.0969	1.0969	1.0949	1.1011	1.1078	1.1125	1.1175	(40)
HLP (average)												1.1101	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

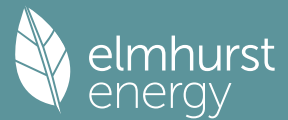
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.6651 (42)
Hot water usage for mixer showers													
68.9045	67.8690	66.3601	63.4730	61.3424	58.9664	57.6159	59.1134	60.7550	63.3061	66.2551	68.6405	68.6405	(42a)
Hot water usage for baths													
29.7544	29.3125	28.6902	27.5429	26.6837	25.7311	25.2165	25.8344	26.5072	27.5266	28.6976	29.6538	29.6538	(42b)
Hot water usage for other uses													
41.9232	40.3987	38.8742	37.3497	35.8252	34.3008	34.3008	35.8252	37.3497	38.8742	40.3987	41.9232	41.9232	(42c)
Average daily hot water use (litres/day)													129.2266 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	140.5821	137.5802	133.9245	128.3656	123.8514	118.9983	117.1332	120.7731	124.6119	129.7069	135.3514	140.2175	(44)
Energy conte	222.6476	195.9124	205.8370	175.7261	166.7278	146.3223	141.6624	149.5423	153.6590	176.0110	192.8329	219.5467	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m													
33.3971	29.3869	30.8755	26.3589	25.0092	21.9483	21.2494	22.4313	23.0488	26.4017	28.9249	32.9320	32.9320	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6525 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8924 (55)
Total storage loss													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)
If cylinder contains dedicated solar storage													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(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													
273.5737	241.9101	256.7631	225.0094	217.6539	195.6056	192.5885	200.4684	202.9423	226.9371	242.1162	270.4728	270.4728	(62)
WWHRS	-31.5003	-27.8591	-29.1724	-24.1559	-22.5125	-19.2641	-18.0570	-19.2018	-19.9313	-23.4969	-26.6191	-30.9169	(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													
242.0734	214.0510	227.5906	200.8535	195.1414	176.3415	174.5315	181.2666	183.0109	203.4402	215.4971	239.5558	239.5558	(64)
12Total per year (kWh/year)													
Electric shower(s)													2453.3537 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
Heat gains from water heating, kWh/month													
114.7712	101.9391	109.1817	97.8556	96.1778	88.0788	87.8436	90.4637	90.5182	99.2645	103.5436	113.7401	113.7401	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	133.2543	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
133.1380	147.4027	133.1380	137.5759	133.1380	137.5759	133.1380	133.1380	137.5759	133.1380	137.5759	133.1380	133.1380	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
244.5607	247.0985	240.7034	227.0889	209.9032	193.7510	182.9603	180.4225	186.8176	200.4321	217.6178	233.7700	233.7700	(68)

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Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5											
	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254	36.3254 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)											
	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035	-106.6035 (71)
Water heating gains (Table 5)											
	154.2624	151.6950	146.7495	135.9105	129.2713	122.3317	118.0694	121.5910	125.7198	133.4201	143.8105 (72)
Total internal gains											
	597.9373	612.1725	586.5672	566.5516	538.2887	516.6348	497.1439	498.1277	513.0896	532.9664	564.9806 (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
East				2.9900	19.6403	0.6300		0.7000		0.7700		17.9469 (76)
West				9.6800	19.6403	0.6300		0.7000		0.7700		58.1025 (80)
Solar gains	76.0494	148.7687	245.0009	357.3193	437.9082	448.2769	426.7779	366.5959	284.9462	176.5267	94.8247	62.5393 (83)
Total gains	673.9867	760.9413	831.5681	923.8709	976.1969	964.9117	923.9218	864.7237	798.0358	709.4930	659.8052	648.3001 (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)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
tau	61.5616	61.7103	61.8567	62.5539	62.6860	63.3088	63.3088	63.4255	63.0675	62.6860	62.4192
alpha	5.1041	5.1140	5.1238	5.1703	5.1791	5.2206	5.2206	5.2284	5.2045	5.1791	5.1613
util living area											
	0.9953	0.9905	0.9786	0.9353	0.8304	0.6456	0.4802	0.5316	0.7840	0.9567	0.9902
MIT	19.7485	19.9214	20.1885	20.5524	20.8283	20.9649	20.9937	20.9896	20.9056	20.5435	20.0888
Th 2	19.9780	19.9802	19.9824	19.9925	19.9945	20.0034	20.0034	20.0050	19.9999	19.9945	19.9906
util rest of house											
	0.9938	0.9875	0.9713	0.9134	0.7779	0.5579	0.3745	0.4219	0.7047	0.9375	0.9865
MIT 2	18.5297	18.7513	19.0900	19.5430	19.8522	19.9837	20.0014	20.0014	19.9372	19.5428	18.9732
Living area fraction											
	18.7537	18.9663	19.2919	19.7285	20.0316	20.1641	20.1838	20.1830	20.1152	19.7267	19.1783
FLA = Living area / (4) =											
Temperature adjustment											0.0000
adjusted MIT	18.7537	18.9663	19.2919	19.7285	20.0316	20.1641	20.1838	20.1830	20.1152	19.7267	19.1783
											18.7288 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9911	0.9832	0.9648	0.9065	0.7801	0.5727	0.3940	0.4420	0.7149	0.9309	0.9822	0.9926 (94)
Useful gains	667.9851	748.1556	802.3155	837.4755	761.5191	552.6150	363.9928	382.2312	570.4816	660.4475	648.0702	643.4988 (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												
	1516.9701	1472.7543	1336.1538	1118.4645	858.7424	567.8522	365.7492	385.3743	616.2438	940.6966	1250.2410	1510.5924 (97)
Space heating kWh												
	631.6448	486.9303	397.1757	202.3121	72.3341	0.0000	0.0000	0.0000	0.0000	208.5053	433.5630	645.1176 (98a)
Space heating requirement - total per year (kWh/year)												
												3077.5830
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												
	631.6448	486.9303	397.1757	202.3121	72.3341	0.0000	0.0000	0.0000	0.0000	208.5053	433.5630	645.1176 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												
												3077.5830
Space heating per m2												
										(98c) / (4) =		33.0781 (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												
	631.6448	486.9303	397.1757	202.3121	72.3341	0.0000	0.0000	0.0000	0.0000	208.5053	433.5630	645.1176 (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)												
	684.3389	527.5518	430.3095	219.1897	78.3685	0.0000	0.0000	0.0000	0.0000	225.8996	469.7324	698.9357 (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												
	242.0734	214.0510	227.5906	200.8535	195.1414	176.3415	174.5315	181.2666	183.0109	203.4402	215.4971	239.5558 (64)
Efficiency of water heater												
(217)m	86.1093	85.8436	85.2957	84.0760	82.0489	79.8000	79.8000	79.8000	79.8000	84.1150	85.5949	79.8000 (216)
Fuel for water heating, kWh/month												
	281.1235	249.3499	266.8255	238.8950	237.8356	220.9793	218.7112	227.1511	229.3370	241.8596	251.7640	278.0088 (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												
	27.6634	22.1926	19.9820	14.6397	11.3081	9.2388	10.3156	13.4087	17.4165	22.8514	25.8106	28.4323 (232)
Electricity generated by PVs (Appendix M) (negative quantity)												
(233a)m	-42.8911	-60.1367	-85.9555	-96.0632	-103.0705	-95.9912	-94.7837	-89.7293	-80.7356	-68.4828	-47.0288	-37.1191 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												

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(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	-25.2234	-52.9556	-105.0738	-157.5652	-208.1178	-209.0559	-206.6142	-175.0523	-128.4455	-75.6677	-33.6535	-19.9553	(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												3334.3261	(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												2941.8406	(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)												223.2598	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-2299.3676	(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												4286.0589	(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	3334.3261	0.2100	700.2085	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2941.8406	0.2100	617.7865	(264)
Space and water heating			1317.9950	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	223.2598	0.1443	32.2233	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-901.9874	0.1347	-121.5114	
PV Unit electricity exported	-1397.3801	0.1259	-175.9860	
Total			-297.4974	(269)
Total CO2, kg/year			1064.6501	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.4400	(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	3334.3261	1.1300	3767.7885	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2941.8406	1.1300	3324.2798	(278)
Space and water heating			7092.0683	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	223.2598	1.5338	342.4433	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-901.9874	1.4979	-1351.0797	
PV Unit electricity exported	-1397.3801	0.4623	-645.9921	
Total			-1997.0718	(283)
Total Primary energy kWh/year			5567.5406	(286)
Target Primary Energy Rate (TPER)			59.8400	(287)

Summary for Input Data

Plot Reference	AT05	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	3.74	TER	9.63
Environmental	96 A	% DER < TER			61.16
CO ₂ Emissions (t/year)	0.63	DFEE	44.76	TFEE	46.13
Compliance Check	See BREL	% DFEE < TFEE			2.97
% DPER < TPER	22.98	DPER	39.14	TPER	50.81

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2026
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Enter TMP value
Thermal Mass	250.00

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	50.04 m	98.98 m ²	2.61 m
		44.77 m	88.67 m ²	2.69 m

8.0 Living Area	18.01	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
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		235.33	180.21	0.00	None	55.12	Enter Gross Area
	WT05 Timber frame	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		14.07	14.07	0.00	None	0.00	Enter Gross Area

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
	RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	90.80	90.80	None	0.00	Enter Gross Area	0.00
	RT03	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	10.18	8.57	None	0.00	Enter Gross Area	1.61

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	98.98
	FT02 Exposed floor	Exposed Floor - Timber	Lowest occupied	Timber exposed floor, insulation between joists	0.13	None	0.00	20.00	2.00

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings	Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
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Summary for Input Data

D001	Solid door	WT01 Brick	North East	2.10
D002	DG Win	WT01 Brick	South West	5.22
W001	DG Win	WT01 Brick	East	1.15
W002	DG Win	WT01 Brick	North East	2.21
W003	DG Win	WT01 Brick	North	1.15
W004	DG Win	WT01 Brick	North East	1.32
W005	DG Win	WT01 Brick	South West	1.32
D003	DG Win	WT01 Brick	South West	2.65
D004	DG Win	WT01 Brick	South West	7.69
D005	Solid door	WT01 Brick	North East	1.96
W006	DG Win	WT01 Brick	North West	1.48
W008	DG Win	WT01 Brick	North West	0.82
W009	DG Win	WT01 Brick	North West	1.48
W007	DG Win	WT01 Brick	North West	2.17
W010	DG Win	WT01 Brick	South East	2.44
W011	DG Win	WT01 Brick	East	1.15
W012	DG Win	WT01 Brick	South East	2.21
W013	DG Win	WT01 Brick	South	1.15
W014	DG Win	WT01 Brick	North East	2.17
W015	DG Win	WT01 Brick	North East	1.48
W016	DG Win	WT01 Brick	South East	1.48
W017	DG Win	WT01 Brick	South West	2.17
W018	DG Win	WT01 Brick	South West	2.17
W019	DG Win	WT01 Brick	South West	2.17
W020	DG Win	WT01 Brick	North West	0.82
W021	DG Win	WT01 Brick	South East	0.82
W022	DG Win	WT01 Brick	South East	2.17
RL01	Roof light	RT03	South	1.61

0

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	Non Gov Approved Schemes	3.66	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	32.33	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	25.39	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	82.20	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	50.04	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	42.55	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	17.87	0.06	0.06 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	9.64	0.06	0.06 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	39.79	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	13.21	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	14.37	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	0.00	0.24	0.24 Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	5.84	0.32	0.32 Table R2	No

Y-value 0.06 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)

Summary for Input Data

Duct Installation Specification	Level 1				
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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

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes		
Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting	No
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Name	Efficacy	Power	Capacity	Count
LEL	85.00	10.00	850.00	20

24.0 Main Heating 1

SAP table		
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	214	
In Winter	249.90	
In Summer	175.10	
Controls SAP Code	2207	
Controls description	Time and temperature zone control by arrangement	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	35.00	

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

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 mains

Summary for Input Data

Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	

Recommendations

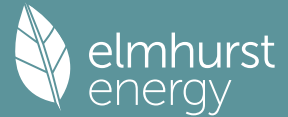
Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT05				Issued on Date	07/05/2026
Assessment Reference	Be Green		Plot Type Ref			
Plot Address					SAP Version	10.2
SAP Rating	81 B	DER	3.74	TER	9.63	
Environmental	96 A	% DER < TER				61.16
CO ₂ Emissions (t/year)	0.63	DFEE	44.76	TFEE	46.13	
Compliance Check	See BREL	% DFEE < TFEE				2.97
% DPER < TPER	22.98	DPER	39.14	TPER	50.81	
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC					

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	98.9800 (1b)	x 2.6100 (2b)	= 258.3378 (1b) - (3b)
First floor	88.6700 (1c)	x 2.6900 (2c)	= 238.5223 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	187.6500		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	496.8601 (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)
Wind speed	Jan 5.1000 Feb 5.0000 Mar 4.9000 Apr 4.4000 May 4.3000 Jun 3.8000 Jul 3.8000 Aug 3.7000 Sep 4.0000 Oct 4.3000 Nov 4.5000 Dec 4.7000 (22)
Wind factor	1.2750 1.2500 1.2250 1.1000 1.0750 0.9500 0.9500 0.9250 1.0000 1.0750 1.1250 1.1750 (22a)
Adj infilt rate	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) =	79.2000 (23c)
Effective ac	0.2666 0.2634 0.2602 0.2442 0.2411 0.2251 0.2251 0.2219 0.2315 0.2411 0.2474 0.2538 (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							
DG Win			51.0600	1.1450	58.4656		(27)
Solid door			4.0600	1.0000	4.0600		(26)
Roof light			1.6100	1.1450	1.8435		(27a)
FT01			98.9800	0.1300	12.8674		(28a)
FT02 Exposed floor			2.0000	0.1300	0.2600		(28b)
WT01 Brick	235.3300	55.1200	180.2100	0.1800	32.4378		(29a)
WT05 Timber frame	14.0700		14.0700	0.1800	2.5326		(29a)
RT01	90.8000		90.8000	0.1100	9.9880		(30)
RT03	10.1800	1.6100	8.5700	0.1100	0.9427		(30)
Total net area of external elements Aum(A, m ²)			451.3600				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	123.3977		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							

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K1 Element	Length	Psi-value	Total									
E1 Steel lintel with perforated steel base plate	3.6600	0.0500	0.1830									
E2 Other lintels (including other steel lintels)	32.3300	0.0500	1.6165									
E3 Sill	25.3900	0.0500	1.2695									
E4 Jamb	82.2000	0.0500	4.1100									
E5 Ground floor (normal)	50.0400	0.1600	8.0064									
E6 Intermediate floor within a dwelling	42.5500	0.0000	0.0000									
E10 Eaves (insulation at ceiling level)	17.8700	0.0600	1.0722									
E12 Gable (insulation at ceiling level)	9.6400	0.0600	0.5784									
E16 Corner (normal)	39.7900	0.0900	3.5811									
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889									
E18 Party wall between dwellings	0.0000	0.0600	0.0000									
P1 Party wall - Ground floor	0.0000	0.0800	0.0000									
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000									
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000									
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000									
E15 Flat roof with parapet	14.3700	0.5600	8.0472									
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.2400	0.0000									
E20 Exposed floor (normal)	5.8400	0.3200	1.8688									
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			29.1442 (36)									
Point Thermal bridges			(36a) = 0.0000									
Total fabric heat loss		(33) + (36) + (36a) =	152.5419 (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	43.7066	43.1840	42.6613	40.0482	39.5255	36.9124	36.9124	36.3897	37.9576	39.5255	40.5708	41.6161 (38)
Average = Sum(39)m / 12 =	196.2485	195.7258	195.2032	192.5900	192.0674	189.4542	189.4542	188.9316	190.4995	192.0674	193.1127	194.1579 (39)
												192.4594
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0458	1.0430	1.0403	1.0263	1.0235	1.0096	1.0096	1.0068	1.0152	1.0235	1.0291	1.0347 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

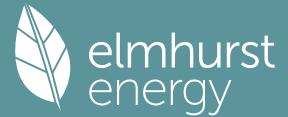
Assumed occupancy												2.9858 (42)
Hot water usage for mixer showers												
Hot water usage for baths	74.2824	73.1661	71.5394	68.4270	66.1301	63.5687	62.1127	63.7271	65.4968	68.2470	71.4262	73.9978 (42a)
Hot water usage for other uses	32.0671	31.5908	30.9202	29.6836	28.7577	27.7310	27.1765	27.8424	28.5675	29.6661	30.9281	31.9587 (42b)
Average daily hot water use (litres/day)	45.2079	43.5639	41.9200	40.2761	38.6322	36.9883	36.9883	38.6322	40.2761	41.9200	43.5639	45.2079 (42c)
												139.3152 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	151.5573	148.3208	144.3796	138.3867	133.5200	128.2879	126.2774	130.2017	134.3404	139.8331	145.9183	151.1643 (44)
Energy content (annual)	240.0298	211.2069	221.9060	189.4445	179.7436	157.7450	152.7216	161.2169	165.6552	189.7522	207.8874	236.6868 (45)
Distribution loss (46)m = 0.15 x (45)m	36.0045	31.6810	33.2859	28.4167	26.9615	23.6617	22.9082	24.1825	24.8483	28.4628	31.1831	35.5030 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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	306.1205	270.9018	287.9968	253.4033	245.8343	221.7038	218.8124	227.3077	229.6140	255.8430	271.8462	302.7775 (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	306.1205	270.9018	287.9968	253.4033	245.8343	221.7038	218.8124	227.3077	229.6140	255.8430	271.8462	302.7775 (64)
12Total per year (kWh/year)												3092.1613 (64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month	132.6825	117.9822	126.6564	114.1573	112.6374	103.6173	103.6526	106.4772	106.2474	115.9652	120.2896	131.5710 (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	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	181.1506	200.5596	181.1506	187.1890	181.1506	187.1890	181.1506	181.1506	187.1890	181.1506	187.1890	181.1506 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	359.1514	362.8783	353.4867	333.4931	308.2548	284.5344	268.6876	264.9608	274.3524	294.3459	319.5842	343.3047 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331 (71)
Water heating gains (Table 5)	178.3367	175.5687	170.2370	158.5518	151.3943	143.9128	139.3179	143.1146	147.5658	155.8672	167.0689	176.8427 (72)
Total internal gains	789.4261	809.7940	775.6618	750.0213	711.5871	683.4236	656.9436	657.0134	676.8946	702.1512	744.6295	772.0854 (73)

6. Solar gains

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[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	
North	1.1500		10.6334		0.6300		0.7000		0.7700		3.7372	(74)
Northeast	7.1800		11.2829		0.6300		0.7000		0.7700		24.7582	(75)
East	2.3000		19.6403		0.6300		0.7000		0.7700		13.8053	(76)
Southeast	9.1200		36.7938		0.6300		0.7000		0.7700		102.5514	(77)
South	1.1500		46.7521		0.6300		0.7000		0.7700		16.4312	(78)
Southwest	23.3900		36.7938		0.6300		0.7000		0.7700		263.0129	(79)
Northwest	6.7700		11.2829		0.6300		0.7000		0.7700		23.3444	(81)
South	1.6100		26.0000		0.6300		0.7000		1.0000		16.6142	(82)

Solar gains	464.2549	816.1702	1180.6384	1564.3290	1840.6789	1865.1991	1782.5883	1571.3610	1313.0994	919.6118	560.7751	394.2155	(83)
Total gains	1253.6810	1625.9643	1956.3002	2314.3504	2552.2660	2548.6227	2439.5319	2228.3744	1989.9939	1621.7630	1305.4047	1166.3009	(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	66.4018	66.5791	66.7574	67.6632	67.8473	68.7831	68.7831	68.9734	68.4057	67.8473	67.4800	67.1168	
alpha	5.4268	5.4386	5.4505	5.5109	5.5232	5.5855	5.5855	5.5982	5.5604	5.5232	5.4987	5.4745	
util living area	0.9966	0.9866	0.9546	0.8493	0.6674	0.4718	0.3411	0.3888	0.6366	0.9199	0.9902	0.9977	(86)
MIT	20.0572	20.2670	20.5221	20.7839	20.9076	20.9400	20.9439	20.9434	20.9233	20.7221	20.3339	20.0251	(87)
Th 2	20.0453	20.0476	20.0499	20.0615	20.0638	20.0753	20.0753	20.0776	20.0707	20.0638	20.0591	20.0545	(88)
util rest of house	0.9955	0.9824	0.9413	0.8135	0.6104	0.4054	0.2698	0.3115	0.5604	0.8906	0.9864	0.9969	(89)
MIT 2	18.9398	19.2078	19.5262	19.8392	19.9644	20.0018	20.0039	20.0061	19.9866	19.7816	19.3038	18.9061	(90)
Living area fraction									FLA = Living area / (4) =			0.0960	(91)
MIT	19.0470	19.3094	19.6217	19.9298	20.0549	20.0918	20.0941	20.0961	20.0765	19.8719	19.4027	19.0135	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.0470	19.3094	19.6217	19.9298	20.0549	20.0918	20.0941	20.0961	20.0765	19.8719	19.4027	19.0135	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9939	0.9782	0.9340	0.8079	0.6098	0.4066	0.2712	0.3130	0.5609	0.8834	0.9829	0.9957	(94)
Useful gains	1246.0610	1590.4973	1827.2336	1869.8451	1556.4502	1036.3060	661.6420	697.5863	1116.1008	1432.6356	1283.0987	1161.3325	(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	2894.0823	2820.2957	2561.4058	2124.2338	1604.7081	1040.4489	661.9727	698.3104	1138.5126	1780.8258	2375.8066	2876.1617	(97)
Space heating kWh	1226.1279	826.4245	546.2241	183.1599	35.9039	0.0000	0.0000	0.0000	0.0000	259.0535	786.7497	1275.8330	(98a)
Space heating requirement - total per year (kWh/year)												5139.4765	
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	1226.1279	826.4245	546.2241	183.1599	35.9039	0.0000	0.0000	0.0000	0.0000	259.0535	786.7497	1275.8330	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5139.4765	
Space heating per m2										(98c) / (4) =		27.3886	(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 %)

249.9000 (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	1226.1279	826.4245	546.2241	183.1599	35.9039	0.0000	0.0000	0.0000	0.0000	259.0535	786.7497	1275.8330	(98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000	(210)
Space heating fuel (main heating system)	490.6474	330.7021	218.5771	73.2933	14.3673	0.0000	0.0000	0.0000	0.0000	103.6629	314.8258	510.5374	(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

306.1205 270.9018 287.9968 253.4033 245.8343 221.7038 218.8124 227.3077 229.6140 255.8430 271.8462 302.7775 (64)

Efficiency of water heater

(217)m 175.1000 175.1000 175.1000 175.1000 175.1000 175.1000 175.1000 175.1000 175.1000 175.1000 175.1000 175.1000 (216)

Fuel for water heating, kWh/month

174.8261 154.7126 164.4756 144.7192 140.3965 126.6155 124.9642 129.8159 131.1330 146.1125 155.2520 172.9169 (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

51.1740 46.2217 51.1740 49.5232 51.1740 49.5232 51.1740 51.1740 49.5232 51.1740 49.5232 51.1740 (231)

Lighting

39.7588 31.8960 28.7188 21.0406 16.2524 13.2783 14.8260 19.2714 25.0316 32.8428 37.0959 40.8638 (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)

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(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												2056.6133	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												175.1000	
Water heating fuel used												1765.9402	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)													
mechanical ventilation fans (SFP = 0.9940)												602.5323	(230a)
Total electricity for the above, kWh/year												602.5323	(231)
Electricity for lighting (calculated in Appendix L)												320.8764	(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												4745.9622	(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	2056.6133	0.1573	323.5620	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1765.9402	0.1409	248.7449	(264)
Space and water heating			572.3070	(265)
Pumps, fans and electric keep-hot	602.5323	0.1387	83.5787	(267)
Energy for lighting	320.8764	0.1443	46.3124	(268)
Total CO2, kg/year			702.1980	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.7400	(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	2056.6133	1.5824	3254.3669	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1765.9402	1.5208	2685.7051	(278)
Space and water heating			5940.0721	(279)
Pumps, fans and electric keep-hot	602.5323	1.5128	911.5109	(281)
Energy for lighting	320.8764	1.5338	492.1710	(282)
Total Primary energy kWh/year			7343.7539	(286)
Dwelling Primary energy Rate (DPER)			39.1400	(287)

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

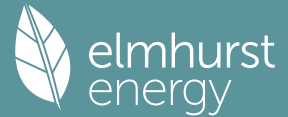
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	98.9800 (1b)	x 2.6100 (2b)	= 258.3378	(1b) - (3b)
First floor	88.6700 (1c)	x 2.6900 (2c)	= 238.5223	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	187.6500			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 496.8601	(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	4 * 10 =	40.0000	(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) =	40.0000 / (5) =	0.0805	(8)
Pressure test	Yes		
Pressure Test Method	Blower Door		
Measured/design AP50	5.0000		(17)
Infiltration rate	0.3305		(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) =	0.2809	(21)

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Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	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)
Adj infilt rate	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)
Effective ac	0.3582	0.3512	0.3441	0.3090	0.3020	0.2669	0.2669	0.2599	0.2809	0.3020	0.3160	0.3301	(22b)
	0.5641	0.5617	0.5592	0.5477	0.5456	0.5356	0.5356	0.5338	0.5395	0.5456	0.5499	0.5545	(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			4.0600	1.0000	4.0600			(26)
TER Opening Type			41.5900	1.1450	47.6221			(27)
TER Roof Window			1.3100	1.1450	2.0852			(27a)
FT01			98.9800	0.1300	12.8674			(28a)
FT02 Exposed floor			2.0000	0.1300	0.2600			(28b)
WT01 Brick	235.3300	45.6500	189.6800	0.1800	34.1424			(29a)
WT05 Timber frame	14.0700		14.0700	0.1800	2.5326			(29a)
RT01	90.8000		90.8000	0.1100	9.9880			(30)
RT03	10.1800	1.3100	8.8700	0.1100	0.9757			(30)
Total net area of external elements Aum(A, m2)			451.3600					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	114.5334		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	3.6600	0.0500	0.1830	
E2 Other lintels (including other steel lintels)	32.3300	0.0500	1.6165	
E3 Sill	25.3900	0.0500	1.2695	
E4 Jamb	82.2000	0.0500	4.1100	
E5 Ground floor (normal)	50.0400	0.1600	8.0064	
E6 Intermediate floor within a dwelling	42.5500	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	17.8700	0.0600	1.0722	
E12 Gable (insulation at ceiling level)	9.6400	0.0600	0.5784	
E16 Corner (normal)	39.7900	0.0900	3.5811	
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	14.3700	0.5600	8.0472	
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.2400	0.0000	
E20 Exposed floor (normal)	5.8400	0.3200	1.8688	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			29.1442	(36)
Point Thermal Bridges			0.0000	(36a) =
Total fabric heat loss			(33) + (36) + (36a) =	143.6776 (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	92.4999	92.0915	91.6912	89.8108	89.4590	87.8212	87.8212	87.5179	88.4521	89.4590	90.1707	90.9147	(38)
Average = Sum(39)m / 12 =	236.1776	235.7691	235.3688	233.4884	233.1366	231.4989	231.4989	231.1956	232.1297	233.1366	233.8483	234.5924	(39)
												233.4867	(39)
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.2586	1.2564	1.2543	1.2443	1.2424	1.2337	1.2337	1.2321	1.2370	1.2424	1.2462	1.2502	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	
												31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9858	(42)	
Hot water usage for mixer showers	74.2824	73.1661	71.5394	68.4270	66.1301	63.5687	62.1127	63.7271	65.4968	68.2470	71.4262	73.9978	(42a)	
Hot water usage for baths	32.0671	31.5908	30.9202	29.6836	28.7577	27.7310	27.1765	27.8424	28.5675	29.6661	30.9281	31.9587	(42b)	
Hot water usage for other uses	45.2079	43.5639	41.9200	40.2761	38.6322	36.9883	36.9883	38.6322	40.2761	41.9200	43.5639	45.2079	(42c)	
Average daily hot water use (litres/day)												139.3152	(43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Energy content (annual)	151.5573	148.3208	144.3796	138.3867	133.5200	128.2879	126.2774	130.2017	134.3404	139.8331	145.9183	151.1643	(44)	
Distribution loss (46)m = 0.15 x (45)m	240.0298	211.2069	221.9060	189.4445	179.7436	157.7450	152.7216	161.2169	165.6552	189.7522	207.8874	236.6868	(45)	
Water storage loss (or HIU loss):	36.0045	31.6810	33.2859	28.4167	26.9615	23.6617	22.9082	24.1825	24.8483	28.4628	31.1831	35.5030	(46)	
Store volume													200.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6525	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													0.8924	(55)
Total storage loss	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)	
If cylinder contains dedicated solar storage	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(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	290.9558	257.2046	272.8321	238.7278	230.6697	207.0283	203.6477	212.1430	214.9385	240.6783	257.1707	287.6129	(62)	
WWHRS	-33.9588	-30.0334	-31.4493	-26.0413	-24.2695	-20.7676	-19.4663	-20.7005	-21.4870	-25.3308	-28.6967	-33.3299	(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	256.9970	227.1712	241.3828	212.6865	206.4001	186.2607	184.1814	191.4425	193.4515	215.3476	228.4740	254.2829	(64)	
12Total per year (kWh/year)													2598.0783	(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														

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120.5508 107.0245 114.5246 102.4169 100.5056 91.8768 91.5208 94.3455 94.5070 103.8335 108.5492 119.4392 (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	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	149.2914	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	181.1506	200.5596	181.1506	187.1890	181.1506	187.1890	181.1506	181.1506	187.1890	181.1506	187.1890	181.1506	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	359.1514	362.8783	353.4867	333.4931	308.2548	284.5344	268.6876	264.9608	274.3524	294.3459	319.5842	343.3047	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	37.9291	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	-119.4331	(71)
Water heating gains (Table 5)	162.0306	159.2626	153.9309	142.2457	135.0882	127.6067	123.0118	126.8084	131.2597	139.5611	150.7628	160.5366	(72)
Total internal gains	773.1200	793.4879	759.3556	733.7152	695.2810	667.1175	640.6375	640.7073	660.5885	685.8451	728.3234	755.7793	(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				
North					0.9400	10.6334		0.6300	0.7000	0.7700		3.0547 (74)				
Northeast					5.8400	11.2829		0.6300	0.7000	0.7700		20.1376 (75)				
East					1.8800	19.6403		0.6300	0.7000	0.7700		11.2844 (76)				
Southeast					7.4300	36.7938		0.6300	0.7000	0.7700		83.5479 (77)				
South					0.9400	46.7521		0.6300	0.7000	0.7700		13.4308 (78)				
Southwest					19.0500	36.7938		0.6300	0.7000	0.7700		214.2110 (79)				
Northwest					5.5100	11.2829		0.6300	0.7000	0.7700		18.9997 (81)				
South					1.3100	26.0000		0.6300	0.7000	1.0000		13.5184 (82)				
Solar gains					378.1844	664.8438	961.7021	1274.1866	1499.2323	1519.1833	1451.9062	1279.8958	1069.5813	749.0972	456.8080	321.1315 (83)
Total gains					1151.3044	1458.3317	1721.0578	2007.9018	2194.5133	2186.3008	2092.5437	1920.6030	1730.1698	1434.9423	1185.1315	1076.9108 (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	55.1756	55.2712	55.3652	55.8111	55.8953	56.2908	56.2908	56.3646	56.1378	55.8953	55.7252	55.5485	
alpha	4.6784	4.6847	4.6910	4.7207	4.7264	4.7527	4.7527	4.7576	4.7425	4.7264	4.7150	4.7032	
util living area	0.9978	0.9930	0.9796	0.9328	0.8203	0.6392	0.4785	0.5384	0.7925	0.9640	0.9945	0.9984	(86)
MIT	19.4341	19.6843	20.0319	20.4652	20.7933	20.9527	20.9902	20.9834	20.8704	20.4150	19.8368	19.3921	(87)
Th 2	19.8734	19.8751	19.8768	19.8847	19.8862	19.8932	19.8932	19.8944	19.8905	19.8862	19.8832	19.8801	(88)
util rest of house	0.9970	0.9906	0.9724	0.9093	0.7633	0.5442	0.3624	0.4167	0.7085	0.9467	0.9923	0.9978	(89)
MIT 2	18.0546	18.3751	18.8159	19.3521	19.7179	19.8674	19.8903	19.8889	19.8051	19.3048	18.5769	18.0055	(90)
Living area fraction									FLA = Living area / (4) =			0.0960	(91)
MIT	18.1870	18.5007	18.9326	19.4589	19.8211	19.9716	19.9958	19.9940	19.9073	19.4113	18.6978	18.1386	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.1870	18.5007	18.9326	19.4589	19.8211	19.9716	19.9958	19.9940	19.9073	19.4113	18.6978	18.1386	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9951	0.9862	0.9641	0.8981	0.7595	0.5513	0.3734	0.4280	0.7099	0.9366	0.9885	0.9964	(94)
Useful gains	1145.7134	1438.2736	1659.2695	1803.2708	1666.6642	1205.3282	781.4364	822.0821	1228.3309	1343.9103	1171.5517	1073.0129	(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	3279.8027	3206.6321	2926.2375	2465.3893	1893.3237	1243.5138	786.1321	830.9065	1348.0562	2054.2464	2712.1209	3269.8956	(97)
Space heating kWh	1587.7625	1188.3369	942.6242	476.7254	168.6347	0.0000	0.0000	0.0000	0.0000	528.4901	1109.2098	1634.4808	(98a)
Space heating requirement - total per year (kWh/year)												7636.2643	
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	1587.7625	1188.3369	942.6242	476.7254	168.6347	0.0000	0.0000	0.0000	0.0000	528.4901	1109.2098	1634.4808	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												7636.2643	
Space heating per m ²										(98c) / (4) =		40.6942	(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	1587.7625	1188.3369	942.6242	476.7254	168.6347	0.0000	0.0000	0.0000	0.0000	528.4901	1109.2098	1634.4808	(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)	1720.2194	1287.4723	1021.2613	516.4955	182.7028	0.0000	0.0000	0.0000	0.0000	572.5786	1201.7441	1770.8351	(211)
Space heating efficiency (main heating system 2)													

Full SAP Calculation Printout



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	(212)
Space heating fuel (secondary)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(213)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	256.9970	227.1712	241.3828	212.6865	206.4001	186.2607	184.1814	191.4425	193.4515	215.3476	228.4740	254.2829 (64)
Efficiency of water heater (217)m	87.4264	87.2213	86.8041	85.8142	83.6104	79.8000	79.8000	79.8000	79.8000	85.9922	87.1218	79.8000 (216)
Fuel for water heating, kWh/month	293.9583	260.4538	278.0776	247.8454	246.8596	233.4094	230.8037	239.9029	242.4204	250.4268	262.2468	290.7026 (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	37.6395	30.1958	27.1880	19.9191	15.3861	12.5706	14.0357	18.2441	23.6973	31.0922	35.1185	38.6856 (232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-82.1521	-110.8724	-152.5819	-163.9114	-170.4061	-156.6291	-154.4285	-148.6402	-137.8550	-122.7616	-88.4213	-71.5960 (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	-62.7741	-129.7525	-253.8686	-375.7306	-491.7052	-492.4157	-486.8519	-414.7322	-307.2169	-183.9454	-83.2453	-49.8406 (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												8273.3091 (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												3077.1071 (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)												303.7725 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-4892.3345 (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												6847.8542 (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	8273.3091	0.2100	1737.3949 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3077.1071	0.2100	646.1925 (264)
Space and water heating			2383.5874 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	303.7725	0.1443	43.8438 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1560.2555	0.1356	-211.5287
PV Unit electricity exported	-3332.0790	0.1263	-420.9224
Total			-632.4511 (269)
Total CO2, kg/year			1806.9093 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.6300 (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	8273.3091	1.1300	9348.8393 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3077.1071	1.1300	3477.1311 (278)
Space and water heating			12825.9703 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	303.7725	1.5338	465.9364 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1560.2555	1.5011	-2342.1149
PV Unit electricity exported	-3332.0790	0.4637	-1545.1356
Total			-3887.2506 (283)
Total Primary energy kWh/year			9534.7570 (286)
Target Primary Energy Rate (TPER)			50.8100 (287)

Summary for Input Data

Plot Reference	AT06	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	3.97	TER	10.84
Environmental	96 A	% DER < TER			63.38
CO ₂ Emissions (t/year)	0.53	DFEE	43.17	TFEE	44.80
Compliance Check	See BREL	% DFEE < TFEE			3.63
% DPER < TPER	26.48	DPER	41.71	TPER	56.74

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	3	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	36.28 m	61.78 m ²	2.61 m
	2nd Storey:	29.54 m	52.04 m ²	2.69 m
		11.94 m	32.20 m ²	2.16 m

8.0 Living Area	19.91	m ²
-----------------	-------	----------------

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
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		94.69	69.06	0.00	None	25.63	Enter Gross Area
	WT02 Tile hung	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		93.49	86.06	0.00	None	7.43	Enter Gross Area
	WT03 Dormer	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		7.98	6.50	0.00	None	1.48	Enter Gross Area

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
	RT01 Ceiling	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	4.05	4.05	None	0.00	Enter Gross Area	0.00
	RT03 Flat	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	8.31	7.23	None	0.00	Enter Gross Area	1.08
	RT02 Rafter	External Slope Roof	Plasterboard, insulated slope	0.11	9.00	73.02	72.34	None	0.00	Enter Gross Area	0.68

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	61.78

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

Summary for Input Data

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	North East	2.10	
D002	DG Win	WT01 Brick	South West	2.65	
W001	DG Win	WT01 Brick	North East	2.72	
W002	DG Win	WT01 Brick	North East	2.72	
W003	DG Win	WT01 Brick	South	1.15	
W004	DG Win	WT01 Brick	South East	2.79	
W005	DG Win	WT01 Brick	East	1.15	
D003	DG Win	WT01 Brick	South West	5.22	
W006	DG Win	WT01 Brick	South East	1.48	
W008	DG Win	WT02 Tile hung	North East	1.48	
W009	DG Win	WT02 Tile hung	North East	1.48	
W007	DG Win	WT02 Tile hung	North East	0.82	
W010	DG Win	WT02 Tile hung	South East	2.17	
W011	DG Win	WT02 Tile hung	South West	1.48	
W012	DG Win	WT01 Brick	South West	2.17	
W013	DG Win	WT03 Dormer	North East	1.48	
W014	DG Win	WT01 Brick	North East	1.48	
RL01	Roof light	RT02 Rafter	South West	0.68	0
RL02	Roof light	RT03 Flat	South West	1.08	0

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	23.32	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	18.57	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	49.95	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	36.28	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	31.99	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	3.33	0.06	0.06 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	23.81	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	2.61	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	14.37	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	9.56	0.24	0.24 Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	0.00	0.32	0.32 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	17.92	0.04	0.04 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	11.02	0.08	0.08 Table R2	No
R1 Head of roof window	Non Gov Approved Schemes	0.75	0.08	0.08 Table R2	No
R2 Sill of roof window	Non Gov Approved Schemes	0.75	0.06	0.06 Table R2	No
R3 Jamb of roof window	Non Gov Approved Schemes	1.80	0.08	0.08 Table R2	No
R4 Ridge (vaulted ceiling)	Non Gov Approved Schemes	8.96	0.08	0.08 Table R2	No
R7 Flat ceiling (inverted)	Non Gov Approved Schemes	2.96	0.04	0.04 Table R2	No
R9 Roof to wall (flat ceiling)	Non Gov Approved Schemes	6.52	0.04	0.04 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)

Summary for Input Data

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				
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 Fixed Lighting	No				
	Name LEL	Efficacy 85.00	Power 10.00	Capacity 850.00	Count 20
24.0 Main Heating 1					
	SAP table				
Percentage of Heat	100.00 %				
Fuel Type	Electricity				
SAP Code	214				
In Winter	249.90				
In Summer	175.10				
Controls SAP Code	2207				
Controls description	Time and temperature zone control by arrangement				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators and Underfloor				
Underfloor Heating	Yes - Pipes in thin screed				
Flow Temperature	Enter value				
Flow Temperature Value	35.00				
25.0 Main Heating 2					
	None				
26.0 Heat Networks					
	None				
27.0 Secondary Heating					
	None				
28.0 Water Heating					
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 mains				

Summary for Input Data

Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	

Recommendations

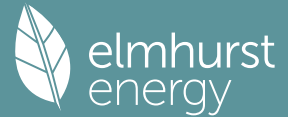
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT06				Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref				
Plot Address					SAP Version	10.2
SAP Rating	81 B	DER	3.97	TER	10.84	
Environmental	96 A	% DER < TER				63.38
CO ₂ Emissions (t/year)	0.53	DFEE	43.17	TFEE	44.80	
Compliance Check	See BREL	% DFEE < TFEE				3.63
% DPER < TPER	26.48	DPER	41.71	TPER	56.74	
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC					

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	61.7800 (1b)	x 2.6100 (2b)	= 161.2458 (1b) - (3b)
First floor	52.0400 (1c)	x 2.6900 (2c)	= 139.9876 (1c) - (3c)
Second floor	32.2000 (1d)	x 2.1600 (2d)	= 69.5520 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	146.0200		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	370.7854 (5)

2. Ventilation rate

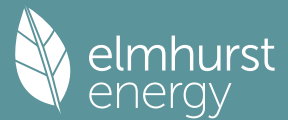
	m ³ per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			32.4400	1.1450	37.1450		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof light			1.7600	1.1450	2.0153		(27a)
FT01			61.7800	0.1300	8.0314		(28a)
WT01 Brick	94.6900	25.6300	69.0600	0.1800	12.4308		(29a)
WT02 Tile hung	93.4900	7.4300	86.0600	0.1800	15.4908		(29a)
WT03 Dormer	7.9800	1.4800	6.5000	0.1800	1.1700		(29a)
RT01 Ceiling	4.0500		4.0500	0.1100	0.4455		(30)
RT03 Flat	8.3100	1.0800	7.2300	0.1100	0.7953		(30)
RT02 Rafter	73.0200	0.6800	72.3400	0.1100	7.9574		(30)
Total net area of external elements Aum(A, m ²)			343.3200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	87.5815		(33)

Full SAP Calculation Printout



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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	23.3200	0.0500	1.1660
E3 Sill	18.5700	0.0500	0.9285
E4 Jamb	49.9500	0.0500	2.4975
E5 Ground floor (normal)	36.2800	0.1600	5.8048
E6 Intermediate floor within a dwelling	31.9900	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	3.3300	0.0600	0.1998
E12 Gable (insulation at ceiling level)	0.0000	0.0600	0.0000
E16 Corner (normal)	23.8100	0.0900	2.1429
E17 Corner (inverted - internal area greater than external area)	2.6100	-0.0900	-0.2349
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	14.3700	0.5600	8.0472
E24 Eaves (insulation at ceiling level - inverted)	9.5600	0.2400	2.2944
E20 Exposed floor (normal)	0.0000	0.3200	0.0000
E11 Eaves (insulation at rafter level)	17.9200	0.0400	0.7168
E13 Gable (insulation at rafter level)	11.0200	0.0800	0.8816
R1 Head of roof window	0.7500	0.0800	0.0600
R2 Sill of roof window	0.7500	0.0600	0.0450
R3 Jamb of roof window	1.8000	0.0800	0.1440
R4 Ridge (vaulted ceiling)	8.9600	0.0800	0.7168
R7 Flat ceiling (inverted)	2.9600	0.0400	0.1184
R9 Roof to wall (flat ceiling)	6.5200	0.0400	0.2608
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			25.7896 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss			(33) + (36) + (36a) = 113.3711 (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	(38)
Heat transfer coeff	32.6164	32.2263	31.8363	29.8862	29.4962	27.5461	27.5461	27.1561	28.3262	29.4962	30.2763	31.0563	(39)
Average = Sum(39)m / 12 =	145.9875	145.5975	145.2074	143.2573	142.8673	140.9172	140.9172	140.5272	141.6973	142.8673	143.6474	144.4274	(39)
												143.1598	
HLP	0.9998	0.9971	0.9944	0.9811	0.9784	0.9651	0.9651	0.9624	0.9704	0.9784	0.9838	0.9891	(40)
HLP (average)												0.9804	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

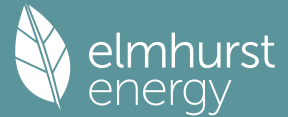
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9278 (42)
Hot water usage for mixer showers	73.3090	72.2073	70.6020	67.5304	65.2636	62.7357	61.2989	62.8921	64.6386	67.3527	70.4903	73.0282	(42a)
Hot water usage for baths	31.6485	31.1785	30.5166	29.2962	28.3823	27.3691	26.8217	27.4790	28.1946	29.2789	30.5244	31.5415	(42b)
Hot water usage for other uses	44.6134	42.9911	41.3688	39.7465	38.1241	36.5018	36.5018	38.1241	39.7465	41.3688	42.9911	44.6134	(42c)
Average daily hot water use (litres/day)												137.4892	(43)
Daily hot water use	149.5709	146.3769	142.4873	136.5730	131.7701	126.6066	124.6224	128.4952	132.5796	138.0004	144.0058	149.1830	(44)
Energy conte	236.8838	208.4387	218.9977	186.9616	177.3879	155.6776	150.7200	159.1039	163.4840	187.2652	205.1627	233.5846	(45)
Energy content (annual)										Total = Sum(45)m =		2283.6676	
Distribution loss (46)m = 0.15 x (45)m	35.5326	31.2658	32.8497	28.0442	26.6082	23.3516	22.6080	23.8656	24.5226	28.0898	30.7744	35.0377	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.7200 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.9288 (55)
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980	(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	302.9745	268.1336	285.0884	250.9204	243.4786	219.6364	216.8108	225.1947	227.4428	253.3560	269.1215	299.6753	(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)
FV 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	302.9745	268.1336	285.0884	250.9204	243.4786	219.6364	216.8108	225.1947	227.4428	253.3560	269.1215	299.6753	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		3061.8330	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
												0.0000	(64a)
Heat gains from water heating, kWh/month	131.6365	117.0618	125.6893	113.3318	111.8541	102.9298	102.9870	105.7747	105.5255	115.1383	119.3836	130.5395	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	159.4659	176.5515	159.4659	164.7814	159.4659	164.7814	159.4659	159.4659	164.7814	159.4659	164.7814	159.4659	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	316.1589	319.4397	311.1723	293.5721	271.3550	250.4740	236.5242	233.2435	241.5108	259.1111	281.3282	302.2092	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	(71)
Water heating gains (Table 5)													

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Total internal gains	176.9307	174.1991	168.9373	157.4052	150.3415	142.9581	138.4234	142.1702	146.5631	154.7558	165.8106	175.4563 (72)
	722.4722	740.1069	709.4921	685.6754	651.0790	625.1302	601.3302	601.7963	619.7720	643.2494	681.8369	707.0480 (73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
Northeast					12.1800	11.2829	0.6300	0.7000			0.7700			41.9992 (75)
East					1.1500	19.6403	0.6300	0.7000			0.7700			6.9027 (76)
Southeast					6.4400	36.7938	0.6300	0.7000			0.7700			72.4157 (77)
South					1.1500	46.7521	0.6300	0.7000			0.7700			16.4312 (78)
Southwest					11.5200	36.7938	0.6300	0.7000			0.7700			129.5386 (79)
Southwest					1.7600	26.0000	0.6300	0.7000			1.0000			18.1621 (82)
Solar gains	285.4496	507.6282	748.2835	1012.1080	1207.4899	1230.2536	1173.0614	1023.1349	839.3351	575.8245	345.8761	241.6735 (83)		
Total gains	1007.9218	1247.7351	1457.7756	1697.7834	1858.5689	1855.3838	1774.3915	1624.9311	1459.1071	1219.0738	1027.7129	948.7215 (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	69.4599	69.6460	69.8330	70.7837	70.9769	71.9591	71.9591	72.1588	71.5630	70.9769	70.5915	70.2102
alpha	5.6307	5.6431	5.6555	5.7189	5.7318	5.7973	5.7973	5.8106	5.7709	5.7318	5.7061	5.6807
util living area	0.9959	0.9865	0.9579	0.8599	0.6816	0.4822	0.3489	0.3967	0.6466	0.9215	0.9889	0.9971 (86)
MIT	20.1330	20.3145	20.5433	20.7903	20.9108	20.9424	20.9460	20.9455	20.9267	20.7399	20.3890	20.1056 (87)
Th 2	20.0835	20.0857	20.0880	20.0991	20.1014	20.1126	20.1126	20.1148	20.1081	20.1014	20.0969	20.0924 (88)
util rest of house	0.9946	0.9823	0.9456	0.8260	0.6261	0.4171	0.2788	0.3210	0.5723	0.8931	0.9848	0.9961 (89)
MIT 2	19.0673	19.2991	19.5852	19.8823	20.0052	20.0417	20.0437	20.0459	20.0272	19.8360	19.4043	19.0396 (90)
Living area fraction	19.2126	19.4376	19.7159	20.0061	20.1287	20.1645	20.1667	20.1686	20.1499	19.9592	19.5386	19.1849 (92)
MIT	19.2126	19.4376	19.7159	20.0061	20.1287	20.1645	20.1667	20.1686	20.1499	19.9592	19.5386	19.1849 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2126	19.4376	19.7159	20.0061	20.1287	20.1645	20.1667	20.1686	20.1499	19.9592	19.5386	19.1849 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9929	0.9786	0.9395	0.8222	0.6279	0.4210	0.2831	0.3256	0.5759	0.8878	0.9814	0.9948 (94)
Useful gains	1000.7944	1220.9804	1369.6137	1395.8832	1166.9413	781.0598	502.3736	529.0585	840.3603	1082.2934	1008.6465	943.7814 (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	2177.0538	2116.6348	1919.0424	1591.0360	1204.1823	784.1408	502.6139	529.5878	857.2481	1337.1284	1786.7655	2164.2335 (97)
Space heating kWh	875.1370	601.8798	408.7750	140.5101	27.7073	0.0000	0.0000	0.0000	0.0000	189.5972	560.2457	908.0163 (98a)
Space heating requirement - total per year (kWh/year)												3711.8683
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	875.1370	601.8798	408.7750	140.5101	27.7073	0.0000	0.0000	0.0000	0.0000	189.5972	560.2457	908.0163 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3711.8683
Space heating per m2										(98c) / (4) =		25.4203 (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 %)												249.9000 (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	875.1370	601.8798	408.7750	140.5101	27.7073	0.0000	0.0000	0.0000	0.0000	189.5972	560.2457	908.0163 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)	350.1949	240.8482	163.5754	56.2265	11.0873	0.0000	0.0000	0.0000	0.0000	75.8692	224.1879	363.3519 (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	302.9745	268.1336	285.0884	250.9204	243.4786	219.6364	216.8108	225.1947	227.4428	253.3560	269.1215	299.6753 (64)
Efficiency of water heater (217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)
Fuel for water heating, kWh/month	173.0294	153.1317	162.8146	143.3012	139.0512	125.4348	123.8211	128.6092	129.8931	144.6922	153.6959	171.1453 (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	38.1889	34.4932	38.1889	36.9570	38.1889	36.9570	38.1889	38.1889	36.9570	38.1889	36.9570	38.1889 (231)
Lighting	32.4566	26.0379	23.4442	17.1763	13.2674	10.8396	12.1030	15.7319	20.4342	26.8108	30.2828	33.3587 (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)												

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(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												1485.3415	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												175.1000	
Water heating fuel used												1748.6196	(219)
Space cooling fuel												0.0000	(221)
Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)													
mechanical ventilation fans (SFP = 0.9940)												449.6440	(230a)
Total electricity for the above, kWh/year												449.6440	(231)
Electricity for lighting (calculated in Appendix L)												261.9435	(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												3945.5486	(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	1485.3415	0.1572	233.5454	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1748.6196	0.1408	246.2927	(264)
Space and water heating			479.8381	(265)
Pumps, fans and electric keep-hot	449.6440	0.1387	62.3712	(267)
Energy for lighting	261.9435	0.1443	37.8065	(268)
Total CO2, kg/year			580.0158	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.9700	(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	1485.3415	1.5821	2349.8917	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1748.6196	1.5208	2659.3166	(278)
Space and water heating			5009.2083	(279)
Pumps, fans and electric keep-hot	449.6440	1.5128	680.2215	(281)
Energy for lighting	261.9435	1.5338	401.7777	(282)
Total Primary energy kWh/year			6091.2075	(286)
Dwelling Primary energy Rate (DPER)			41.7100	(287)

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

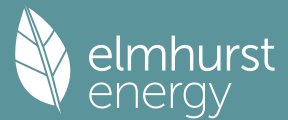
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	61.7800 (1b)	x 2.6100 (2b)	= 161.2458 (1b) - (3b)	
First floor	52.0400 (1c)	x 2.6900 (2c)	= 139.9876 (1c) - (3c)	
Second floor	32.2000 (1d)	x 2.1600 (2d)	= 69.5520 (1d) - (3d)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	146.0200			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	370.7854	(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	4 * 10 =	40.0000 (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) =	40.0000 / (5) = 0.1079 (8)

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Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.3579 (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) =	0.3042 (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												
Effective ac	0.3879	0.3802	0.3726	0.3346	0.3270	0.2890	0.2890	0.2814	0.3042	0.3270	0.3422	0.3574 (22b)
	0.5752	0.5723	0.5694	0.5560	0.5535	0.5418	0.5418	0.5396	0.5463	0.5535	0.5586	0.5639 (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			2.1000	1.0000	2.1000		(26)
TER Opening Type			32.4400	1.1450	37.1450		(27)
TER Roof Window			1.7600	1.1450	2.8015		(27a)
FT01			61.7800	0.1300	8.0314		(28a)
WT01 Brick	94.6900	25.6300	69.0600	0.1800	12.4308		(29a)
WT02 Tile hung	93.4900	7.4300	86.0600	0.1800	15.4908		(29a)
WT03 Dormer	7.9800	1.4800	6.5000	0.1800	1.1700		(29a)
RT01 Ceiling	4.0500		4.0500	0.1100	0.4455		(30)
RT03 Flat	8.3100	1.0800	7.2300	0.1100	0.7953		(30)
RT02 Rafter	73.0200	0.6800	72.3400	0.1100	7.9574		(30)
Total net area of external elements Aum(A, m2)			343.3200				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	88.3677		(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	23.3200	0.0500	1.1660
E3 Sill	18.5700	0.0500	0.9285
E4 Jamb	49.9500	0.0500	2.4975
E5 Ground floor (normal)	36.2800	0.1600	5.8048
E6 Intermediate floor within a dwelling	31.9900	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	3.3300	0.0600	0.1998
E12 Gable (insulation at ceiling level)	0.0000	0.0600	0.0000
E16 Corner (normal)	23.8100	0.0900	2.1429
E17 Corner (inverted - internal area greater than external area)	2.6100	-0.0900	-0.2349
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	14.3700	0.5600	8.0472
E24 Eaves (insulation at ceiling level - inverted)	9.5600	0.2400	2.2944
E20 Exposed floor (normal)	0.0000	0.3200	0.0000
E11 Eaves (insulation at rafter level)	17.9200	0.0400	0.7168
E13 Gable (insulation at rafter level)	11.0200	0.0800	0.8816
R1 Head of roof window	0.7500	0.0800	0.0600
R2 Sill of roof window	0.7500	0.0600	0.0450
R3 Jamb of roof window	1.8000	0.0800	0.1440
R4 Ridge (vaulted ceiling)	8.9600	0.0800	0.7168
R7 Flat ceiling (inverted)	2.9600	0.0400	0.1184
R9 Roof to wall (flat ceiling)	6.5200	0.0400	0.2608

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

25.7896 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 114.1573 (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	70.3828	70.0254	69.6751	68.0298	67.7219	66.2889	66.2889	66.0236	66.8409	67.7219	68.3447	68.9957 (38)
Heat transfer coeff	184.5401	184.1827	183.8324	182.1871	181.8793	180.4463	180.4463	180.1809	180.9982	181.8793	182.5020	183.1531 (39)
Average = Sum(39)m / 12 =												182.1856

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	1.2638	1.2614	1.2590	1.2477	1.2456	1.2358	1.2358	1.2339	1.2395	1.2456	1.2498	1.2543 (40)
HLP (average)												1.2477
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9278 (42)
Hot water usage for mixer showers												
73.3090	72.2073	70.6020	67.5304	65.2636	62.7357	61.2989	62.8921	64.6386	67.3527	70.4903	73.0282 (42a)	
Hot water usage for baths												
31.6485	31.1785	30.5166	29.2962	28.3823	27.3691	26.8217	27.4790	28.1946	29.2789	30.5244	31.5415 (42b)	
Hot water usage for other uses												
44.6134	42.9911	41.3688	39.7465	38.1241	36.5018	36.5018	38.1241	39.7465	41.3688	42.9911	44.6134 (42c)	
Average daily hot water use (litres/day)												137.4892 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use												
	149.5709	146.3769	142.4873	136.5730	131.7701	126.6066	124.6224	128.4952	132.5796	138.0004	144.0058	149.1830 (44)
Energy conte	236.8838	208.4387	198.9977	186.9616	177.3879	155.6776	150.7200	159.1039	163.4840	187.2652	205.1627	233.5846 (45)
Energy content (annual)										Total = Sum(45)m =		2283.6676
Distribution loss (46)m = 0.15 x (45)m												
	35.5326	31.2658	32.8497	28.0442	26.6082	23.3516	22.6080	23.8656	24.5226	28.0898	30.7744	35.0377 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.6525 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8924 (55)
Total storage loss												
	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (56)

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If cylinder contains dedicated solar storage											
Primary loss	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713 (57)
Combi loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	23.2624 (59)
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
WWHRS	287.8098	254.4365	269.9238	236.2449	228.3139	204.9609	201.6461	210.0300	212.7673	238.1913	254.4460 (62)
PV diverter	-33.5138	-29.6399	-31.0372	-25.7000	-23.9515	-20.4955	-19.2112	-20.4292	-21.2054	-24.9988	-28.3206 (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 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
12Total per year (kWh/year)	254.2960	224.7966	238.8866	210.5449	204.3624	184.4654	182.4349	189.6008	191.5618	213.1925	226.1253 (64)
Electric shower(s)	Total per year (kWh/year) = Sum(64a)m =										2571.8845 (64)
	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 =											2572 (64a)
Heat gains from water heating, kWh/month											
	119.5047	106.1041	113.5576	101.5914	99.7223	91.1894	90.8553	93.6429	93.7851	103.0065	107.6432 (65)

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

Metabolic gains (Table 5), Watts											
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Lighting gains	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888	146.3888 (66)
Appliances gains	159.4659	176.5515	159.4659	164.7814	159.4659	164.7814	159.4659	159.4659	164.7814	159.4659	164.7814 (67)
Cooking gains	316.1589	319.4397	311.1723	293.5721	271.3550	250.4740	236.5242	233.2435	241.5108	259.1111	281.3282 (68)
Pumps, fans	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389	37.6389 (69)
Losses e.g. evaporation	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000 (70)
Water heating gains	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111	-117.1111 (71)
Total internal gains	160.6246	157.8930	152.6312	141.0991	134.0354	126.6520	122.1173	125.8641	130.2570	138.4497	149.5045 (72)
	706.1661	723.8008	693.1860	669.3693	634.7729	608.8240	585.0240	585.4901	603.4659	626.9432	665.5307 (73)

6. Solar gains

[Jan]	Area	Solar flux	g	FF	Access	Gains
	m2	Table 6a	Specific data	Specific data	factor	W
		W/m2	or Table 6b	or Table 6c	Table 6d	
Northeast	12.1800	11.2829	0.6300	0.7000	0.7700	41.9992 (75)
East	1.1500	19.6403	0.6300	0.7000	0.7700	6.9027 (76)
Southeast	6.4400	36.7938	0.6300	0.7000	0.7700	72.4157 (77)
South	1.1500	46.7521	0.6300	0.7000	0.7700	16.4312 (78)
Southwest	11.5200	36.7938	0.6300	0.7000	0.7700	129.5386 (79)
Southwest	1.7600	26.0000	0.6300	0.7000	1.0000	18.1621 (82)

Solar gains	285.4496	507.6282	748.2835	1012.1080	1207.4899	1230.2536	1173.0614	1023.1349	839.3351	575.8245	345.8761	241.6735 (83)
Total gains	991.6157	1231.4290	1441.4695	1681.4773	1842.2627	1839.0777	1758.0854	1608.6250	1442.8010	1202.7677	1011.4068	932.4153 (84)

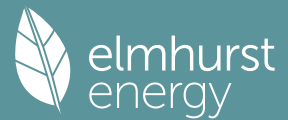
7. Mean internal temperature (heating season)

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)
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
alpha	54.9489	55.0555	55.1604	55.6586	55.7528	56.1956	56.1956	56.2783	56.0242	55.7528	55.5625
util living area	4.6633	4.6704	4.6774	4.7106	4.7169	4.7464	4.7464	4.7519	4.7349	4.7169	4.7042
	0.9966	0.9903	0.9733	0.9158	0.7881	0.6004	0.4459	0.5043	0.7613	0.9535	0.9920
MIT	19.4942	19.7438	20.0911	20.5207	20.8271	20.9633	20.9927	20.9873	20.8913	20.4626	19.8944
Th 2	19.8693	19.8712	19.8731	19.8820	19.8837	19.8915	19.8915	19.8929	19.8885	19.8837	19.8803
util rest of house											
	0.9954	0.9870	0.9642	0.8882	0.7274	0.5078	0.3365	0.3885	0.6742	0.9322	0.9888
MIT 2	18.1286	18.4475	18.8861	19.4126	19.7463	19.8721	19.8894	19.8888	19.8189	19.3584	18.6476
Living area fraction											
MIT	18.3148	18.6243	19.0504	19.5637	19.8937	20.0209	20.0398	20.0386	19.9652	19.5090	18.8176
Temperature adjustment											
adjusted MIT	18.3148	18.6243	19.0504	19.5637	19.8937	20.0209	20.0398	20.0386	19.9652	19.5090	18.8176

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9929	0.9819	0.9553	0.8787	0.7280	0.5191	0.3514	0.4041	0.6809	0.9228	0.9842	0.9946 (94)
Ext temp.	984.5887	1209.0871	1377.0853	1477.5891	1341.1676	954.6748	617.8262	650.1153	982.3322	1109.8563	995.4416	927.3454 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Space heating kWh	2586.2986	2527.7764	2307.1782	1942.7797	1490.2620	978.1762	620.7019	655.6036	1061.5833	1620.3583	2138.4898	2576.6881 (97)
Space heating requirement - total per year (kWh/year)	1191.6721	886.1592	691.9891	334.9373	110.9262	0.0000	0.0000	0.0000	0.0000	379.8135	822.9947	1227.1110 (98a)
Solar heating kWh												5645.6033
Solar heating contribution - total per year (kWh/year)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Space heating kWh	1191.6721	886.1592	691.9891	334.9373	110.9262	0.0000	0.0000	0.0000	0.0000	379.8135	822.9947	1227.1110 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5645.6033
Space heating per m2	(98c) / (4) =											38.6632 (99)

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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	1191.6721	886.1592	691.9891	334.9373	110.9262	0.0000	0.0000	0.0000	0.0000	379.8135	822.9947	1227.1110	(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)	1291.0857	960.0858	749.7174	362.8790	120.1801	0.0000	0.0000	0.0000	0.0000	411.4989	891.6519	1329.4810	(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	254.2960	224.7966	238.8866	210.5449	204.3624	184.4654	182.4349	189.6008	191.5618	213.1925	226.1253	251.6175	(64)
Efficiency of water heater	87.0730	86.8187	86.3022	85.0957	82.7507	79.8000	79.8000	79.8000	79.8000	85.3398	86.6926	87.1279	(216)
Fuel for water heating, kWh/month	292.0493	258.9264	276.8025	247.4214	246.9615	231.1597	228.6151	237.5950	240.0524	249.8160	260.8358	288.7907	(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	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	(231)
Lighting	33.1339	26.5812	23.9334	17.5347	13.5443	11.0658	12.3555	16.0602	20.8606	27.3703	30.9146	34.0548	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-56.2878	-78.5960	-111.8786	-124.4773	-133.0408	-123.6428	-121.9826	-115.6502	-104.4266	-89.1120	-61.5578	-48.7424	(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	-34.1703	-71.5939	-141.8142	-212.3491	-280.2269	-281.4691	-278.2832	-235.9880	-173.3724	-102.3242	-45.5908	-27.0542	(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												6116.5799	(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												3059.0258	(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)												267.4092	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3053.6313	(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												6475.3836	(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	6116.5799	0.2100	1284.4818	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3059.0258	0.2100	642.3954	(264)
Space and water heating			1926.8772	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	267.4092	0.1443	38.5954	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1169.3948	0.1348	-157.6589	
PV Unit electricity exported	-1884.2364	0.1260	-237.3673	
Total			-395.0262	(269)
Total CO2, kg/year			1582.3757	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			10.8400	(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	6116.5799	1.1300	6911.7353	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3059.0258	1.1300	3456.6991	(278)
Space and water heating			10368.4345	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	267.4092	1.5338	410.1612	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1169.3948	1.4983	-1752.0909	
PV Unit electricity exported	-1884.2364	0.4624	-871.3064	
Total			-2623.3973	(283)
Total Primary energy kWh/year			8285.2992	(286)
Target Primary Energy Rate (TPER)			56.7400	(287)

Summary for Input Data

Plot Reference	AT07	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	82 B	DER	3.55	TER	9.76
Environmental	96 A	% DER < TER			63.63
CO ₂ Emissions (t/year)	0.6	DFEE	41.31	TFEE	43.15
Compliance Check	See BREL	% DFEE < TFEE			4.28
% DPER < TPER	27.32	DPER	37.20	TPER	51.18

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	3	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	No	

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	40.98 m	78.04 m ²	2.61 m
	2nd Storey:	35.36 m	68.92 m ²	2.69 m
		14.56 m	40.30 m ²	2.18 m

8.0 Living Area	15.80	m ²
-----------------	-------	----------------

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
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		220.62	188.37	0.00	None	32.25	Enter Gross Area
	WT03 Dormer	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		6.38	3.42	0.00	None	2.96	Enter Gross Area

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
	RT01 Ceiling	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	7.25	7.25	None	0.00	Enter Gross Area	0.00
	RT03 Flat	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	9.13	8.05	None	0.00	Enter Gross Area	1.08
	RT02 Rafter	External Slope Roof	Plasterboard, insulated slope	0.11	9.00	86.30	82.90	None	0.00	Enter Gross Area	3.40

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	78.04

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D001	Solid door	WT01 Brick	South	2.10	
D002	DG Win	WT01 Brick	North	5.22	
W001	DG Win	WT01 Brick	South	2.72	
W002	DG Win	WT01 Brick	South	2.72	
W003	DG Win	WT01 Brick	North	0.82	
W004	DG Win	WT01 Brick	West	2.44	
W005	DG Win	WT01 Brick	East	1.67	
D003	DG Win	WT01 Brick	North	5.22	
W006	DG Win	WT01 Brick	South	1.50	
W008	DG Win	WT01 Brick	South	1.50	
W009	DG Win	WT01 Brick	West	1.50	
W007	DG Win	WT01 Brick	South	1.50	
W010	DG Win	WT01 Brick	North	1.67	
W011	DG Win	WT01 Brick	North	1.67	
W012	DG Win	WT03 Dormer	South	1.48	
W013	DG Win	WT03 Dormer	South	1.48	
RL01	Roof light	RT02 Rafter	North	0.68	0
RL02	Roof light	RT02 Rafter	North	0.68	0
RL03	Roof light	RT02 Rafter	North	0.68	0
RL04	Roof light	RT02 Rafter	North	0.68	0
RL05	Roof light	RT02 Rafter	North	0.68	0
RL06	Roof light	RT03 Flat	North	1.08	0

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	23.26	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	17.29	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	46.20	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	50.04	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	40.31	0.00	0.00 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	18.29	0.04	0.04 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	17.09	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	34.41	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	13.21	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	13.07	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	3.25	0.24	0.24 Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	0.00	0.32	0.32 Table R2	No
R1 Head of roof window	Non Gov Approved Schemes	3.75	0.08	0.08 Table R2	No
R2 Sill of roof window	Non Gov Approved Schemes	3.75	0.06	0.06 Table R2	No
R3 Jamb of roof window	Non Gov Approved Schemes	9.00	0.08	0.08 Table R2	No
R4 Ridge (vaulted ceiling)	Non Gov Approved Schemes	9.28	0.08	0.08 Table R2	No
R7 Flat ceiling (inverted)	Non Gov Approved Schemes	5.49	0.04	0.04 Table R2	No
R9 Roof to wall (flat ceiling)	Non Gov Approved Schemes	6.36	0.04	0.04 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)

Summary for Input Data

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				
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 Fixed Lighting	No				
	Name LEL	Efficacy 85.00	Power 10.00	Capacity 850.00	Count 20
24.0 Main Heating 1					
	SAP table				
Percentage of Heat	100.00 %				
Fuel Type	Electricity				
SAP Code	214				
In Winter	249.90				
In Summer	175.10				
Controls SAP Code	2207				
Controls description	Time and temperature zone control by arrangement				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators and Underfloor				
Underfloor Heating	Yes - Pipes in thin screed				
Flow Temperature	Enter value				
Flow Temperature Value	35.00				
25.0 Main Heating 2					
	None				
26.0 Heat Networks					
	None				
27.0 Secondary Heating					
	None				
28.0 Water Heating					
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 mains				

Summary for Input Data

Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	

Recommendations

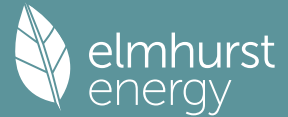
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT07				Issued on Date	07/05/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	3.55	TER	9.76		
Environmental	96 A	% DER < TER				63.63	
CO ₂ Emissions (t/year)	0.6	DFEE	41.31	TFEE	43.15		
Compliance Check	See BREL	% DFEE < TFEE				4.28	
% DPER < TPER	27.32	DPER	37.20	TPER	51.18		
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	78.0400 (1b)	x 2.6100 (2b)	= 203.6844 (1b) - (3b)
First floor	68.9200 (1c)	x 2.6900 (2c)	= 185.3948 (1c) - (3c)
Second floor	40.3000 (1d)	x 2.1800 (2d)	= 87.8540 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	187.2600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 476.9332 (5)

2. Ventilation rate

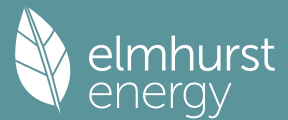
	m ³ per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			33.1100	1.1450	37.9122		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof light			4.4800	1.1450	5.1298		(27a)
FT01			78.0400	0.1300	10.1452		(28a)
WT01 Brick	220.6200	32.2500	188.3700	0.1800	33.9066		(29a)
WT03 Dormer	6.3800	2.9600	3.4200	0.1800	0.6156		(29a)
RT01 Ceiling	7.2500		7.2500	0.1100	0.7975		(30)
RT03 Flat	9.1300	1.0800	8.0500	0.1100	0.8855		(30)
RT02 Rafter	86.3000	3.4000	82.9000	0.1100	9.1190		(30)
Total net area of external elements Aum(A, m ²)			407.7200				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	100.6114	(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)

Full SAP Calculation Printout



List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	23.2600	0.0500	1.1630
E3 Sill	17.2900	0.0500	0.8645
E4 Jamb	46.2000	0.0500	2.3100
E5 Ground floor (normal)	50.0400	0.1600	8.0064
E6 Intermediate floor within a dwelling	40.3100	0.0000	0.0000
E11 Eaves (insulation at rafter level)	18.2900	0.0400	0.7316
E13 Gable (insulation at rafter level)	17.0900	0.0800	1.3672
E16 Corner (normal)	34.4100	0.0900	3.0969
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	13.0700	0.5600	7.3192
E24 Eaves (insulation at ceiling level - inverted)	3.2500	0.2400	0.7800
E20 Exposed floor (normal)	0.0000	0.3200	0.0000
R1 Head of roof window	3.7500	0.0800	0.3000
R2 Sill of roof window	3.7500	0.0600	0.2250
R3 Jamb of roof window	9.0000	0.0800	0.7200
R4 Ridge (vaulted ceiling)	9.2800	0.0800	0.7424
R7 Flat ceiling (inverted)	5.4900	0.0400	0.2196
R9 Roof to wall (flat ceiling)	6.3600	0.0400	0.2544
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			26.9113 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	127.5227 (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	41.9537	41.4521	40.9504	38.4420	37.9403	35.4320	35.4320	34.9303	36.4353	37.9403	38.9437	39.9470 (38)
Heat transfer coeff	169.4764	168.9747	168.4731	165.9647	165.4630	162.9546	162.9546	162.4530	163.9580	165.4630	166.4664	167.4697 (39)
Average = Sum(39)m / 12 =												165.8393
HLP	0.9050	0.9024	0.8997	0.8863	0.8836	0.8702	0.8702	0.8675	0.8756	0.8836	0.8890	0.8943 (40)
HLP (average)												0.8856
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

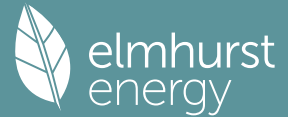
4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9853 (42)
Hot water usage for mixer showers	74.2738	73.1577	71.5311	68.4191	66.1225	63.5614	62.1056	63.7198	65.4893	68.2392	71.4180	73.9893 (42a)
Hot water usage for baths	32.0634	31.5872	30.9166	29.6802	28.7544	27.7278	27.1733	27.8392	28.5642	29.6627	30.9246	31.9550 (42b)
Hot water usage for other uses	45.2027	43.5589	41.9152	40.2715	38.6277	36.9840	36.9840	38.6277	40.2715	41.9152	43.5589	45.2027 (42c)
Average daily hot water use (litres/day)												139.2991 (43)
Daily hot water use	151.5399	148.3038	144.3630	138.3708	133.5047	128.2732	126.2629	130.1867	134.3250	139.8171	145.9015	151.1469 (44)
Energy conte	240.0022	211.1826	221.8805	189.4227	179.7229	157.7269	152.7041	161.1984	165.6361	189.7304	207.8635	236.6596 (45)
Energy content (annual)										Total = Sum(45)m =		2313.7298
Distribution loss (46)m = 0.15 x (45)m	36.0003	31.6774	33.2821	28.4134	26.9584	23.6590	22.9056	24.1798	24.8454	28.4596	31.1795	35.4989 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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	306.0929	270.8775	287.9713	253.3815	245.8137	221.6857	218.7948	227.2891	229.5949	255.8212	271.8223	302.7503 (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	306.0929	270.8775	287.9713	253.3815	245.8137	221.6857	218.7948	227.2891	229.5949	255.8212	271.8223	302.7503 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		3091.8952 (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	132.6733	117.9741	126.6479	114.1501	112.6305	103.6112	103.6467	106.4711	106.2410	115.9580	120.2817	131.5619 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	181.7521	201.2255	181.7521	187.8105	181.7521	187.8105	181.7521	181.7521	187.8105	181.7521	187.8105	181.7521 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	358.7705	362.4934	353.1118	333.1394	307.9279	284.2326	268.4027	264.6798	274.0614	294.0338	319.2453	342.9406 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128 (71)
Water heating gains (Table 5)	178.3244	175.5567	170.2256	158.5418	151.3851	143.9045	139.3101	143.1063	147.5570	155.8575	167.0579	176.8305 (72)
Total internal gains	789.6267	810.0554	775.8693	750.2714	711.8448	683.7273	657.2446	657.3179	677.2087	702.4231	744.8934	772.3030 (73)

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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	
North				14.6000	10.6334	0.6300		0.7000	0.7700		47.4457 (74)	
East				1.6700	19.6403	0.6300		0.7000	0.7700		10.0239 (76)	
South				12.9000	46.7521	0.6300		0.7000	0.7700		184.3157 (78)	
West				3.9400	19.6403	0.6300		0.7000	0.7700		23.6491 (80)	
North				4.4800	26.0000	0.6300		0.7000	1.0000		46.2309 (82)	
Solar gains	311.6653	554.4223	817.7703	1106.9987	1321.5401	1346.8249	1284.0613	1119.3755	917.5704	629.0357	377.6713	263.8502 (83)
Total gains	1101.2920	1364.4777	1593.6396	1857.2701	2033.3849	2030.5522	1941.3059	1776.6934	1594.7790	1331.4588	1122.5647	1036.1531 (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	76.7314	76.9592	77.1884	78.3550	78.5926	79.8024	79.8024	80.0488	79.3140	78.5926	78.1189	77.6509
alpha	6.1154	6.1306	6.1459	6.2237	6.2395	6.3202	6.3202	6.3366	6.2876	6.2395	6.2079	6.1767
util living area	0.9981	0.9927	0.9736	0.8928	0.7195	0.5099	0.3689	0.4196	0.6835	0.9459	0.9942	0.9987 (86)
MIT	20.1713	20.3352	20.5485	20.7923	20.9160	20.9474	20.9505	20.9502	20.9319	20.7420	20.4100	20.1488 (87)
Th 2	20.1632	20.1655	20.1678	20.1792	20.1815	20.1929	20.1929	20.1952	20.1883	20.1815	20.1769	20.1723 (88)
util rest of house	0.9975	0.9904	0.9654	0.8649	0.6675	0.4473	0.3015	0.3467	0.6132	0.9249	0.9920	0.9982 (89)
MIT 2	19.1812	19.3920	19.6619	19.9615	20.0909	20.1280	20.1297	20.1320	20.1132	19.9126	19.4977	19.1599 (90)
Living area fraction	19.2648	19.4715	19.7367	20.0316	20.1605	20.1971	20.1990	20.2010	20.1822	19.9826	19.5747	19.2433 (91)
MIT	19.2648	19.4715	19.7367	20.0316	20.1605	20.1971	20.1990	20.2010	20.1822	19.9826	19.5747	19.2433 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2648	19.4715	19.7367	20.0316	20.1605	20.1971	20.1990	20.2010	20.1822	19.9826	19.5747	19.2433 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9965	0.9879	0.9602	0.8593	0.6661	0.4476	0.3020	0.3473	0.6127	0.9186	0.9898	0.9976 (94)
Useful gains	1097.4882	1347.9203	1530.2157	1595.8996	1354.3806	908.8750	586.2560	616.9917	977.0576	1223.1104	1111.1042	1033.6253 (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	2536.1769	2462.2229	2230.0260	1847.4489	1399.8985	912.0776	586.4681	617.4894	997.2331	1552.4775	2076.6107	2519.2976 (97)
Space heating kWh	1070.3844	748.8113	520.6588	181.1156	33.8653	0.0000	0.0000	0.0000	0.0000	245.0492	695.1647	1105.3402 (98a)
Space heating requirement - total per year (kWh/year)												4600.3894
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	1070.3844	748.8113	520.6588	181.1156	33.8653	0.0000	0.0000	0.0000	0.0000	245.0492	695.1647	1105.3402 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4600.3894
Space heating per m2										(98c) / (4) =		24.5669 (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 %)												249.9000 (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	1070.3844	748.8113	520.6588	181.1156	33.8653	0.0000	0.0000	0.0000	0.0000	245.0492	695.1647	1105.3402 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)	428.3251	299.6444	208.3469	72.4752	13.5515	0.0000	0.0000	0.0000	0.0000	98.0589	278.1771	442.3130 (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	306.0929	270.8775	287.9713	253.3815	245.8137	221.6857	218.7948	227.2891	229.5949	255.8212	271.8223	302.7503 (64)
Efficiency of water heater	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)
Fuel for water heating, kWh/month	174.8103	154.6987	164.4610	144.7067	140.3847	126.6052	124.9542	129.8053	131.1222	146.1001	155.2383	172.9014 (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	49.1216	44.3679	49.1216	47.5370	49.1216	47.5370	49.1216	49.1216	49.1216	49.1216	47.5370	49.1216 (231)
Lighting	39.8626	31.9793	28.7938	21.0956	16.2948	13.3130	14.8647	19.3217	25.0970	32.9286	37.1927	40.9705 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)												

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(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												1840.8921	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												175.1000	
Water heating fuel used												1765.7882	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)													
mechanical ventilation fans (SFP = 0.9940)												578.3674	(230a)
Total electricity for the above, kWh/year												578.3674	(231)
Electricity for lighting (calculated in Appendix L)												321.7144	(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												4506.7621	(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	1840.8921	0.1571	289.2277	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1765.7882	0.1409	248.7234	(264)
Space and water heating			537.9511	(265)
Pumps, fans and electric keep-hot	578.3674	0.1387	80.2267	(267)
Energy for lighting	321.7144	0.1443	46.4333	(268)
Total CO2, kg/year			664.6111	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.5500	(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	1840.8921	1.5816	2911.5870	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1765.7882	1.5208	2685.4736	(278)
Space and water heating			5597.0607	(279)
Pumps, fans and electric keep-hot	578.3674	1.5128	874.9541	(281)
Energy for lighting	321.7144	1.5338	493.4562	(282)
Total Primary energy kWh/year			6965.4710	(286)
Dwelling Primary energy Rate (DPER)			37.2000	(287)

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

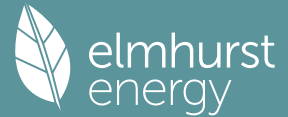
1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	78.0400 (1b)	x	2.6100 (2b)	=	203.6844 (1b)	- (3b)
First floor	68.9200 (1c)	x	2.6900 (2c)	=	185.3948 (1c)	- (3c)
Second floor	40.3000 (1d)	x	2.1800 (2d)	=	87.8540 (1d)	- (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	187.2600					(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e) ... (3n) =	476.9332	(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	4 * 10 =	40.0000	(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)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.0839 (8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.3339	(18)

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Number of sides sheltered

2 (19)

Shelter factor

$$(20) = 1 - [0.075 \times (19)] = 0.8500 \quad (20)$$

Infiltration rate adjusted to include shelter factor

$$(21) = (18) \times (20) = 0.2838 \quad (21)$$

	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													
Effective ac	0.3618	0.3547	0.3476	0.3122	0.3051	0.2696	0.2696	0.2625	0.2838	0.3051	0.3193	0.3335	(22b)
	0.5655	0.5629	0.5604	0.5487	0.5465	0.5363	0.5363	0.5345	0.5403	0.5465	0.5510	0.5556	(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			2.1000	1.0000	2.1000			(26)
TER Opening Type			33.1100	1.1450	37.9122			(27)
TER Roof Window			4.4800	1.1450	7.1311			(27a)
FT01			78.0400	0.1300	10.1452			(28a)
WT01 Brick	220.6200	32.2500	188.3700	0.1800	33.9066			(29a)
WT03 Dormer	6.3800	2.9600	3.4200	0.1800	0.6156			(29a)
RT01 Ceiling	7.2500		7.2500	0.1100	0.7975			(30)
RT03 Flat	9.1300	1.0800	8.0500	0.1100	0.8855			(30)
RT02 Rafter	86.3000	3.4000	82.9000	0.1100	9.1190			(30)
Total net area of external elements Aum(A, m2)			407.7200					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	102.6127		(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	23.2600	0.0500	1.1630	
E3 Sill	17.2900	0.0500	0.8645	
E4 Jamb	46.2000	0.0500	2.3100	
E5 Ground floor (normal)	50.0400	0.1600	8.0064	
E6 Intermediate floor within a dwelling	40.3100	0.0000	0.0000	
E11 Eaves (insulation at rafter level)	18.2900	0.0400	0.7316	
E13 Gable (insulation at rafter level)	17.0900	0.0800	1.3672	
E16 Corner (normal)	34.4100	0.0900	3.0969	
E17 Corner (inverted - internal area greater than external area)	13.2100	-0.0900	-1.1889	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	13.0700	0.5600	7.3192	
E24 Eaves (insulation at ceiling level - inverted)	3.2500	0.2400	0.7800	
E20 Exposed floor (normal)	0.0000	0.3200	0.0000	
R1 Head of roof window	3.7500	0.0800	0.3000	
R2 Sill of roof window	3.7500	0.0600	0.2250	
R3 Jamb of roof window	9.0000	0.0800	0.7200	
R4 Ridge (vaulted ceiling)	9.2800	0.0800	0.7424	
R7 Flat ceiling (inverted)	5.4900	0.0400	0.2196	
R9 Roof to wall (flat ceiling)	6.3600	0.0400	0.2544	

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

Point Thermal bridges		(36a) =	0.0000	
Total fabric heat loss		(33) + (36) + (36a) =	129.5240	(37)

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

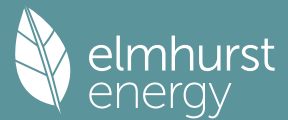
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	88.9967	88.5966	88.2045	86.3626	86.0180	84.4138	84.4138	84.1167	85.0317	86.0180	86.7151	87.4440	(38)
Heat transfer coeff													
Average = Sum(39)m / 12 =	218.5207	218.1206	217.7285	215.8866	215.5420	213.9378	213.9378	213.6407	214.5557	215.5420	216.2391	216.9680	(39)
													215.8850

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1669	1.1648	1.1627	1.1529	1.1510	1.1425	1.1425	1.1409	1.1458	1.1510	1.1548	1.1586	(40)
HLP (average)												1.1529	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9853 (42)
Hot water usage for mixer showers													
74.2738	73.1577	71.5311	68.4191	66.1225	63.5614	62.1056	63.7198	65.4893	68.2392	71.4180	73.9893	73.9893	(42a)
Hot water usage for baths													
32.0634	31.5872	30.9166	29.6802	28.7544	27.7278	27.1733	27.8392	28.5642	29.6627	30.9246	31.9550	31.9550	(42b)
Hot water usage for other uses													
45.2027	43.5589	41.9152	40.2715	38.6277	36.9840	36.9840	38.6277	40.2715	41.9152	43.5589	45.2027	45.2027	(42c)
Average daily hot water use (litres/day)													139.2991 (43)
Daily hot water use													
151.5399	148.3038	144.3630	138.3708	133.5047	128.2732	126.2629	130.1867	134.3250	139.8171	145.9015	151.1469	151.1469	(44)
Energy conte	240.0022	211.1826	221.8805	189.4227	179.7229	157.7269	152.7041	161.1984	165.6361	189.7304	207.8635	236.6596	(45)
Energy content (annual)													
Distribution loss (46)m = 0.15 x (45)m													
36.0003	31.6774	33.2821	28.4134	26.9584	23.6590	22.9056	24.1798	24.8454	28.4596	31.1795	35.4989	35.4989	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6525 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8924 (55)
Total storage loss													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	(56)
If cylinder contains dedicated solar storage													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	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													
290.9282	257.1804	272.8066	238.7060	230.6490	207.0102	203.6301	212.1245	214.9194	240.6565	257.1468	287.5856	287.5856	(62)
WWHRS	-33.9549	-30.0300	-31.4457	-26.0383	-24.2667	-20.7652	-19.4641	-20.6981	-21.4845	-25.3278	-28.6934	-33.3261	(63a)

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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	256.9733	227.1504	241.3609	212.6677	206.3823	186.2449	184.1661	191.4264	193.4349	215.3287	228.4534	254.2595	(64)	
												2597.8485	(64)	
12Total per year (kWh/year)	Total per year (kWh/year) = Sum(64)m =												2598	(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	120.5416	107.0164	114.5161	102.4097	100.4987	91.8708	91.5150	94.3393	94.5006	103.8262	108.5413	119.4302	(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	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	149.2659	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	181.7521	201.2255	181.7521	187.8105	181.7521	187.8105	181.7521	181.7521	187.8105	181.7521	187.8105	181.7521	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	358.7705	362.4934	353.1118	333.1394	307.9279	284.2326	268.4027	264.6798	274.0614	294.0338	319.2453	342.9406	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	37.9266	(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)	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	-119.4128	(71)
Water heating gains (Table 5)	162.0182	159.2506	153.9195	142.2357	135.0789	127.5984	123.0040	126.8002	131.2509	139.5514	150.7517	160.5244	(72)
Total internal gains	773.3206	793.7493	759.5632	733.9653	695.5387	667.4212	640.9385	641.0118	660.9025	686.1170	728.5873	755.9968	(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
North					14.6000	10.6334		0.6300	0.7000	0.7700		47.4457 (74)
East					1.6700	19.6403		0.6300	0.7000	0.7700		10.0239 (76)
South					12.9000	46.7521		0.6300	0.7000	0.7700		184.3157 (78)
West					3.9400	19.6403		0.6300	0.7000	0.7700		23.6491 (80)
North					4.4800	26.0000		0.6300	0.7000	1.0000		46.2309 (82)
Solar gains	311.6653	554.4223	817.7703	1106.9987	1321.5401	1346.8249	1284.0613	1119.3755	917.5704	629.0357	377.6713	263.8502 (83)
Total gains	1084.9859	1348.1716	1577.3335	1840.9640	2017.0788	2014.2461	1924.9998	1760.3873	1578.4729	1315.1527	1106.2586	1019.8470 (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	59.5100	59.6191	59.7265	60.2361	60.3324	60.7848	60.7848	60.8693	60.6098	60.3324	60.1379	59.9359	
alpha	4.9673	4.9746	4.9818	5.0157	5.0222	5.0523	5.0523	5.0580	5.0407	5.0222	5.0092	4.9957	
util living area	0.9983	0.9947	0.9840	0.9419	0.8313	0.6455	0.4822	0.5449	0.8066	0.9704	0.9958	0.9988	(86)
MIT	19.5355	19.7607	20.0833	20.4975	20.8125	20.9604	20.9925	20.9866	20.8813	20.4475	19.9109	19.4988	(87)
Th 2	19.9465	19.9483	19.9500	19.9579	19.9594	19.9663	19.9663	19.9676	19.9636	19.9594	19.9564	19.9532	(88)
util rest of house	0.9977	0.9929	0.9783	0.9214	0.7779	0.5552	0.3725	0.4294	0.7279	0.9561	0.9940	0.9983	(89)
MIT 2	18.2355	18.5243	18.9347	19.4505	19.8043	19.9444	19.9640	19.9630	19.8834	19.4012	18.7231	18.1932	(90)
Living area fraction	fLA = Living area / (4) =											0.0844	(91)
MIT	18.3452	18.6286	19.0316	19.5389	19.8894	20.0301	20.0508	20.0493	19.9676	19.4895	18.8233	18.3034	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3452	18.6286	19.0316	19.5389	19.8894	20.0301	20.0508	20.0493	19.9676	19.4895	18.8233	18.3034	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9963	0.9895	0.9714	0.9111	0.7738	0.5610	0.3816	0.4388	0.7283	0.9471	0.9911	0.9972	(94)
Ext temp.	1080.9713	1334.0610	1532.2342	1677.2427	1560.8650	1130.0850	734.6478	772.5319	1149.5412	1245.6289	1096.3986	1017.0338	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Space heating	3069.1562	2994.5018	2728.4902	2296.7926	1765.1508	1161.7019	738.2497	779.6427	1258.9346	1916.0619	2535.0360	3059.9778	(97)
Space heating requirement - total per year (kWh/year)	1479.2096	1115.8162	890.0145	446.0759	151.9886	0.0000	0.0000	0.0000	0.0000	498.8021	1035.8189	1519.9503	(98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Space heating contribution - total per year (kWh/year)	1479.2096	1115.8162	890.0145	446.0759	151.9886	0.0000	0.0000	0.0000	0.0000	498.8021	1035.8189	1519.9503	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												7137.6761	(98c)
Space heating per m ²												38.1164	(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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1479.2096	1115.8162	890.0145	446.0759	151.9886	0.0000	0.0000	0.0000	0.0000	498.8021	1035.8189	1519.9503	(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)	1602.6106	1208.9016	964.2628	483.2892	164.6680	0.0000	0.0000	0.0000	0.0000	540.4140	1122.2307	1646.7500	(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 requirement	256.9733	227.1504	241.3609	212.6677	206.3823	186.2449	184.1661	191.4264	193.4349	215.3287	228.4534	254.2595	(64)
Efficiency of water heater (217)m	87.3420	87.1378	86.7136	85.6803	83.3842	79.8000	79.8000	79.8000	79.8000	85.8795	87.0264	79.8000	(216)
Fuel for water heating, kWh/month	294.2150	260.6796	278.3425	248.2106	247.5077	233.3897	230.7845	239.8827	242.3996	250.7334	262.5104	290.9561	(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	37.7645	30.2961	27.2783	19.9852	15.4372	12.6123	14.0823	18.3047	23.7760	31.1954	35.2351	38.8141	(232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-69.1056	-95.4944	-134.5237	-148.0420	-156.8396	-145.2203	-143.2168	-136.4254	-124.2376	-107.4486	-75.1971	-59.9568	(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	-45.1603	-94.2243	-185.9390	-277.4344	-365.1969	-366.5139	-362.3956	-307.7611	-226.6759	-134.3721	-60.1521	-35.7889	(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												7733.1269	(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												3079.6118	(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)												304.7811	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-3857.3225	(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												7346.1973	(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	7733.1269	0.2100	1623.9567	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3079.6118	0.2100	646.7185	(264)
Space and water heating			2270.6751	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	304.7811	0.1443	43.9893	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1395.7080	0.1351	-188.4992	
PV Unit electricity exported	-2461.6145	0.1261	-310.3577	
Total			-498.8568	(269)
Total CO2, kg/year			1827.7369	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.7600	(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	7733.1269	1.1300	8738.4334	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3079.6118	1.1300	3479.9614	(278)
Space and water heating			12218.3948	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	304.7811	1.5338	467.4834	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1395.7080	1.4992	-2092.4058	
PV Unit electricity exported	-2461.6145	0.4628	-1139.2440	
Total			-3231.6499	(283)
Total Primary energy kWh/year			9584.3291	(286)
Target Primary Energy Rate (TPER)			51.1800	(287)

Summary for Input Data

Plot Reference	AT08	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	82 B	DER	3.56	TER	9.70
Environmental	96 A	% DER < TER			63.30
CO ₂ Emissions (t/year)	0.62	DFEE	42.36	TFEE	43.82
Compliance Check	See BREL	% DFEE < TFEE			3.34
% DPER < TPER	26.75	DPER	37.30	TPER	50.93

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
3.0 Date Built	2026
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Enter TMP value
Thermal Mass	250.00

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	41.81 m	83.23 m²	2.61 m
	2nd Storey:	34.04 m	69.19 m²	2.69 m
		13.57 m	41.77 m²	2.65 m

8.0 Living Area	18.90	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		104.87	73.25	0.00	None	31.62	Enter Gross Area
	WT03 Dormer	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		7.16	4.20	0.00	None	2.96	Enter Gross Area
	WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		111.27	100.04	0.00	None	11.23	Enter Gross Area

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	RT01 Ceiling	External Plane	Plasterboard, insulated at ceiling level	0.11	9.00	2.86	2.86	None	0.00	Enter Gross Area	0.00
	RT03 Flat	External Flat	Plasterboard, insulated flat roof	0.11	9.00	11.20	11.20	None	0.00	Enter Gross Area	0.00
	RT02 Rafter	External Slope	Plasterboard, insulated slope	0.11	9.00	97.12	95.76	None	0.00	Enter Gross Area	1.36

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	83.23

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

Summary for Input Data

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	South	2.38	
D002	DG Win	WT01 Brick	North	5.22	
W001	DG Win	WT01 Brick	South East	1.10	
W002	DG Win	WT01 Brick	South	2.66	
W003	DG Win	WT01 Brick	South East	1.10	
W004	DG Win	WT01 Brick	South East	1.10	
W005	DG Win	WT01 Brick	South	2.66	
D003	DG Win	WT01 Brick	North	2.38	
W006	DG Win	WT01 Brick	South West	1.10	
W008	DG Win	WT01 Brick	West	1.67	
W009	DG Win	WT01 Brick	East	0.92	
W007	DG Win	WT01 Brick	West	2.44	
W010	DG Win	WT01 Brick	East	1.67	
W011	DG Win	WT02 Tile hung	South	2.42	
W012	DG Win	WT02 Tile hung	South	1.67	
W013	DG Win	WT02 Tile hung	South	2.42	
RL01	Roof light	RT02 Rafter	North	0.68	0
RL02	Roof light	RT02 Rafter	North	0.68	0
D004	DG Win	WT01 Brick	North	5.22	
W014	DG Win	WT02 Tile hung	North	1.48	
W015	DG Win	WT02 Tile hung	North	0.82	
W016	DG Win	WT02 Tile hung	North	2.42	
W017	DG Win	WT03 Dormer	South	1.48	
W018	DG Win	WT03 Dormer	South	1.48	

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	29.67	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	22.43	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	66.00	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	41.81	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	32.29	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	13.38	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	23.81	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	2.61	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	14.06	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	8.74	0.24	0.24 Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	0.00	0.32	0.32 Table R2	No
R1 Head of roof window	Non Gov Approved Schemes	1.50	0.08	0.08 Table R2	No
R2 Sill of roof window	Non Gov Approved Schemes	1.50	0.06	0.06 Table R2	No
R3 Jamb of roof window	Non Gov Approved Schemes	3.60	0.08	0.08 Table R2	No
R4 Ridge (vaulted ceiling)	Non Gov Approved Schemes	10.31	0.08	0.08 Table R2	No
R7 Flat ceiling (inverted)	Non Gov Approved Schemes	2.96	0.04	0.04 Table R2	No
R9 Roof to wall (flat ceiling)	Non Gov Approved Schemes	6.58	0.04	0.04 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1

Summary for Input Data

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

21.0 Fixed Cooling System

No

22.0 Pressure Testing

Yes

Designed AP₅₀

3.00

m³/(h.m²) @ 50 Pa

Test Method

Blower Door

22.0 Lighting

No Fixed Lighting

No

Name
LEL

Efficacy
85.00

Power
10.00

Capacity
850.00

Count
20

24.0 Main Heating 1

SAP table

Percentage of Heat

100.00

%

Fuel Type

Electricity

SAP Code

214

In Winter

249.90

In Summer

175.10

Controls SAP Code

2207

Controls description

Time and temperature zone control by arrangement

Is MHS Pumped

Pump in heated space

Heating Pump Age

2013 or later

Heat Emitter

Radiators and Underfloor

Underfloor Heating

Yes - Pipes in thin screed

Flow Temperature

Enter value

Flow Temperature Value

35.00

25.0 Main Heating 2

None

26.0 Heat Networks

None

27.0 Secondary Heating

None

28.0 Water Heating

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

Summary for Input Data

Water use <= 125 litres/person/day	Yes
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

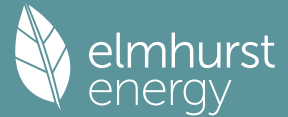
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT08				Issued on Date	07/05/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	3.56	TER	9.70		
Environmental	96 A	% DER < TER				63.30	
CO ₂ Emissions (t/year)	0.62	DFEE	42.36	TFEE	43.82		
Compliance Check	See BREL	% DFEE < TFEE				3.34	
% DPER < TPER	26.75	DPER	37.30	TPER	50.93		
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	83.2300 (1b)	x 2.6100 (2b)	= 217.2303 (1b) - (3b)
First floor	69.1900 (1c)	x 2.6900 (2c)	= 186.1211 (1c) - (3c)
Second floor	41.7700 (1d)	x 2.6500 (2d)	= 110.6905 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	194.1900		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 514.0419 (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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			43.4300	1.1450	49.7290		(27)
Solid door			2.3800	1.0000	2.3800		(26)
Roof light			1.3600	1.1450	1.5573		(27a)
FT01			83.2300	0.1300	10.8199		(28a)
WT01 Brick	104.8700	31.6200	73.2500	0.1800	13.1850		(29a)
WT03 Dormer	7.1600	2.9600	4.2000	0.1800	0.7560		(29a)
WT02 Tile hung	111.2700	11.2300	100.0400	0.1800	18.0072		(29a)
RT01 Ceiling	2.8600		2.8600	0.1100	0.3146		(30)
RT03 Flat	11.2000		11.2000	0.1100	1.2320		(30)
RT02 Rafter	97.1200	1.3600	95.7600	0.1100	10.5336		(30)
Total net area of external elements Aum(A, m ²)			417.7100				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	108.5146		(33)

Full SAP Calculation Printout

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

250.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total
K1 Element	0.0000	0.0500	0.0000
E1 Steel lintel with perforated steel base plate	29.6700	0.0500	1.4835
E2 Other lintels (including other steel lintels)	22.4300	0.0500	1.1215
E3 Sill	66.0000	0.0500	3.3000
E4 Jamb	41.8100	0.1600	6.6896
E5 Ground floor (normal)	32.2900	0.0000	0.0000
E6 Intermediate floor within a dwelling	0.0000	0.0600	0.0000
E10 Eaves (insulation at ceiling level)	13.3800	0.0800	1.0704
E13 Gable (insulation at rafter level)	23.8100	0.0900	2.1429
E16 Corner (normal)	2.6100	-0.0900	-0.2349
E17 Corner (inverted - internal area greater than external area)	0.0000	0.0600	0.0000
E18 Party wall between dwellings	0.0000	0.0800	0.0000
P1 Party wall - Ground floor	0.0000	0.0000	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.1200	0.0000
P4 Party wall - Roof (insulation at ceiling level)	14.0600	0.5600	7.8736
E15 Flat roof with parapet	8.7400	0.2400	2.0976
E24 Eaves (insulation at ceiling level - inverted)	0.0000	0.3200	0.0000
E20 Exposed floor (normal)	1.5000	0.0800	0.1200
R1 Head of roof window	1.5000	0.0600	0.0900
R2 Sill of roof window	3.6000	0.0800	0.2880
R3 Jamb of roof window	10.3100	0.0800	0.8248
R4 Ridge (vaulted ceiling)	2.9600	0.0400	0.1184
R7 Flat ceiling (inverted)	6.5800	0.0400	0.2632
R9 Roof to wall (flat ceiling)			

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

27.2486 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 135.7632 (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	45.2180	44.6773	44.1366	41.4331	40.8924	38.1888	38.1888	37.6481	39.2702	40.8924	41.9738	43.0552
Heat transfer coeff	180.9812	180.4405	179.8998	177.1962	176.6555	173.9520	173.9520	173.4113	175.0334	176.6555	177.7369	178.8183
Average = Sum(39)m / 12 =												177.0610

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP	0.9320	0.9292	0.9264	0.9125	0.9097	0.8958	0.8958	0.8930	0.9014	0.9097	0.9153	0.9208
HLP (average)												0.9118
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

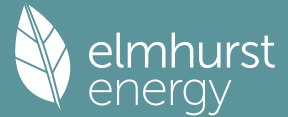
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9944 (42)
Hot water usage for mixer showers													
74.4254	73.3069	71.6771	68.5587	66.2574	63.6910	62.2323	63.8498	65.6229	68.3784	71.5637	74.1402	74.1402	(42a)
Hot water usage for baths													
32.1286	31.6514	30.9795	29.7406	28.8129	27.7842	27.2286	27.8958	28.6223	29.7230	30.9874	32.0199	32.0199	(42b)
Hot water usage for other uses													
45.2952	43.6481	42.0010	40.3539	38.7068	37.0597	37.0597	38.7068	40.3539	42.0010	43.6481	45.2952	45.2952	(42c)
Average daily hot water use (litres/day)													139.5834 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	151.8491	148.6064	144.6576	138.6532	133.7771	128.5349	126.5206	130.4524	134.5991	140.1024	146.1993	151.4554	(44)
Energy conte	240.4919	211.6136	222.3333	189.8092	180.0897	158.0487	153.0157	161.5273	165.9741	190.1176	208.2877	237.1425	(45)
Energy content (annual)										Total = Sum(45)m =		2318.4512	
Distribution loss (46)m = 0.15 x (45)m													
36.0738	31.7420	33.3500	28.4714	27.0134	23.7073	22.9524	24.2291	24.8961	28.5176	31.2432	35.5714	35.5714	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.7200 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.9288 (55)
Total storage loss													
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(56)
If cylinder contains dedicated solar storage													
28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980	(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													
306.5827	271.3084	288.4240	253.7680	246.1804	222.0075	219.1064	227.6181	229.9329	256.2084	272.2465	303.2333	303.2333	(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	306.5827	271.3084	288.4240	253.7680	246.1804	222.0075	219.1064	227.6181	229.9329	256.2084	272.2465	303.2333	(64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		3096.6166	(64)
Electric shower(s)												3097	(64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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													
132.8362	118.1174	126.7984	114.2786	112.7524	103.7182	103.7503	106.5804	106.3534	116.0867	120.4227	131.7225	131.7225	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
184.3475	204.0991	184.3475	190.4925	184.3475	190.4925	184.3475	184.3475	190.4925	184.3475	190.4925	184.3475	184.3475	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
365.4896	369.2823	359.7249	339.3785	313.6948	289.5558	273.4294	269.6368	279.1941	299.5405	325.2242	349.3633	349.3633	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	(71)
Water heating gains (Table 5)													
178.5432	175.7700	170.4280	158.7203	151.5489	144.0531	139.4494	143.2533	147.7131	156.0305	167.2537	177.0464	177.0464	(72)
Total internal gains													

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799.2958 820.0666 785.4158 759.5066 720.5067 692.0167 665.1416 665.1529 685.3150 710.8339 753.8858 781.6725 (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

North						17.5400	10.6334	0.6300	0.7000			0.7700			56.9998 (74)
East						2.5900	19.6403	0.6300	0.7000			0.7700			15.5460 (76)
Southeast						3.3000	36.7938	0.6300	0.7000			0.7700			37.1074 (77)
South						14.7900	46.7521	0.6300	0.7000			0.7700			211.3201 (78)
Southwest						1.1000	36.7938	0.6300	0.7000			0.7700			12.3691 (79)
West						4.1100	19.6403	0.6300	0.7000			0.7700			24.6695 (80)
North						1.3600	26.0000	0.6300	0.7000			1.0000			14.0344 (82)

Solar gains	372.0464	647.1127	922.6415	1208.3732	1414.9705	1432.3211	1369.3922	1210.6908	1020.6871	725.0730	448.0214			316.8662 (83)	
Total gains	1171.3421	1467.1794	1708.0573	1967.8799	2135.4772	2124.3377	2034.5339	1875.8437	1706.0021	1435.9069	1201.9072			1098.5388 (84)	

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	74.5128	74.7361	74.9607	76.1044	76.3374	77.5238	77.5238	77.7655	77.0448	76.3374	75.8729	75.4141
alpha	5.9675	5.9824	5.9974	6.0736	6.0892	6.1683	6.1683	6.1844	6.1363	6.0892	6.0582	6.0276
util living area	0.9979	0.9916	0.9713	0.8927	0.7268	0.5194	0.3756	0.4240	0.6808	0.9410	0.9934	0.9985 (86)
MIT	20.1488	20.3225	20.5384	20.7812	20.9096	20.9453	20.9492	20.9488	20.9293	20.7386	20.3966	20.1245 (87)
Th 2	20.1404	20.1428	20.1451	20.1569	20.1593	20.1711	20.1711	20.1735	20.1664	20.1593	20.1545	20.1498 (88)
util rest of house	0.9972	0.9890	0.9625	0.8644	0.6738	0.4542	0.3052	0.3485	0.6091	0.9184	0.9910	0.9980 (89)
MIT 2	19.1338	19.3569	19.6297	19.9282	20.0630	20.1042	20.1063	20.1087	20.0888	19.8883	19.4621	19.1104 (90)
Living area fraction	19.2326	19.4509	19.7181	20.0112	20.1454	20.1860	20.1884	20.1904	20.1706	19.9710	19.5530	19.2091 (92)
MIT	19.2326	19.4509	19.7181	20.0112	20.1454	20.1860	20.1884	20.1904	20.1706	19.9710	19.5530	19.2091 (93)
Temperature adjustment												0.0000
adjusted MIT	19.2326	19.4509	19.7181	20.0112	20.1454	20.1860	20.1884	20.1904	20.1706	19.9710	19.5530	19.2091 (93)

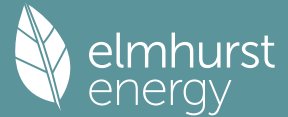
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9961	0.9862	0.9570	0.8588	0.6729	0.4554	0.3067	0.3501	0.6095	0.9122	0.9885	0.9973 (94)
Useful gains	1166.8079	1446.9191	1634.6670	1690.1047	1436.9686	967.4517	623.9059	656.6524	1039.8567	1309.8623	1188.1313	1095.5562 (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	2702.5229	2625.5741	2377.9352	1968.8689	1491.9304	971.7008	624.2018	657.3041	1062.5641	1655.4440	2213.3618	2683.8942 (97)
Space heating kWh	1142.5720	792.0562	552.9915	200.7102	40.8916	0.0000	0.0000	0.0000	0.0000	257.1128	738.1659	1181.7234 (98a)
Space heating requirement - total per year (kWh/year)												4906.2237
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	1142.5720	792.0562	552.9915	200.7102	40.8916	0.0000	0.0000	0.0000	0.0000	257.1128	738.1659	1181.7234 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4906.2237
Space heating per m2										(98c) / (4) =		25.2651 (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 %)												249.9000 (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	1142.5720	792.0562	552.9915	200.7102	40.8916	0.0000	0.0000	0.0000	0.0000	257.1128	738.1659	1181.7234 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)	457.2117	316.9492	221.2851	80.3162	16.3632	0.0000	0.0000	0.0000	0.0000	102.8863	295.3845	472.8785 (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	306.5827	271.3084	288.4240	253.7680	246.1804	222.0075	219.1064	227.6181	229.9329	256.2084	272.2465	303.2333 (64)
Efficiency of water heater (217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)
Fuel for water heating, kWh/month	175.0900	154.9449	164.7196	144.9275	140.5942	126.7890	125.1322	129.9932	131.3152	146.3212	155.4806	173.1772 (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	52.9436	47.8200	52.9436	51.2358	52.9436	51.2358	52.9436	52.9436	51.2358	52.9436	51.2358	52.9436 (231)
Lighting	40.9227	32.8297	29.5595	21.6565	16.7281	13.6670	15.2600	19.8355	25.7643	33.8042	38.1818	42.0600 (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)

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Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation) (235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity) (233b)m	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	(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											1963.2748	(211)
Space heating fuel - main system 2											0.0000	(213)
Space heating fuel - secondary											0.0000	(215)
Efficiency of water heater											175.1000	
Water heating fuel used											1768.4846	(219)
Space cooling fuel											0.0000	(221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940) mechanical ventilation fans (SFP = 0.9940)											623.3683	(230a)
Total electricity for the above, kWh/year											623.3683	(231)
Electricity for lighting (calculated in Appendix L)											330.2692	(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											4685.3970	(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	1963.2748	0.1571	308.4140	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1768.4846	0.1409	249.1052	(264)
Space and water heating			557.5191	(265)
Pumps, fans and electric keep-hot	623.3683	0.1387	86.4689	(267)
Energy for lighting	330.2692	0.1443	47.6681	(268)
Total CO2, kg/year			691.6561	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.5600	(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	1963.2748	1.5815	3104.9914	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1768.4846	1.5208	2689.5817	(278)
Space and water heating			5794.5732	(279)
Pumps, fans and electric keep-hot	623.3683	1.5128	943.0316	(281)
Energy for lighting	330.2692	1.5338	506.5780	(282)
Total Primary energy kWh/year			7244.1827	(286)
Dwelling Primary energy Rate (DPER)			37.3000	(287)

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

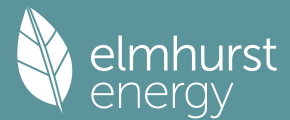
1. Overall dwelling characteristics

	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	83.2300 (1b)	x 2.6100 (2b)	= 217.2303 (1b) - (3b)	
First floor	69.1900 (1c)	x 2.6900 (2c)	= 186.1211 (1c) - (3c)	
Second floor	41.7700 (1d)	x 2.6500 (2d)	= 110.6905 (1d) - (3d)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	194.1900		(4)	
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =	514.0419 (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	4 * 10 =	40.0000 (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) =	40.0000 / (5) = 0.0778 (8)
Pressure test		Yes

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Pressure Test Method
Measured/design AP50
Infiltration rate
Number of sides sheltered

Blower Door
5.0000 (17)
0.3278 (18)
2 (19)

Shelter factor

$$(20) = 1 - [0.075 \times (19)] = 0.8500 (20)$$
$$(21) = (18) \times (20) = 0.2786 (21)$$

Infiltration rate adjusted to include shelter factor

	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	0.3553	0.3483	0.3413	0.3065	0.2995	0.2647	0.2647	0.2577	0.2786	0.2995	0.3135	0.3274	(22b)
Effective ac	0.5631	0.5607	0.5583	0.5470	0.5449	0.5350	0.5350	0.5332	0.5388	0.5449	0.5491	0.5536	(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			2.3800	1.0000	2.3800			(26)
TER Opening Type			43.4300	1.1450	49.7290			(27)
TER Roof Window			1.3600	1.1450	2.1648			(27a)
FT01			83.2300	0.1300	10.8199			(28a)
WT01 Brick	104.8700	31.6200	73.2500	0.1800	13.1850			(29a)
WT03 Dormer	7.1600	2.9600	4.2000	0.1800	0.7560			(29a)
WT02 Tile hung	111.2700	11.2300	100.0400	0.1800	18.0072			(29a)
RT01 Ceiling	2.8600		2.8600	0.1100	0.3146			(30)
RT03 Flat	11.2000		11.2000	0.1100	1.2320			(30)
RT02 Rafter	97.1200	1.3600	95.7600	0.1100	10.5336			(30)
Total net area of external elements Aum(A, m2)			417.7100					(31)
Fabric heat loss, W/K = Sum (A x U)								(32)
								(26)...(30) + (32) = 109.1221

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	29.6700	0.0500	1.4835	
E3 Sill	22.4300	0.0500	1.1215	
E4 Jamb	66.0000	0.0500	3.3000	
E5 Ground floor (normal)	41.8100	0.1600	6.6896	
E6 Intermediate floor within a dwelling	32.2900	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	0.0000	0.0600	0.0000	
E13 Gable (insulation at rafter level)	13.3800	0.0800	1.0704	
E16 Corner (normal)	23.8100	0.0900	2.1429	
E17 Corner (inverted - internal area greater than external area)	2.6100	-0.0900	-0.2349	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	14.0600	0.5600	7.8736	
E24 Eaves (insulation at ceiling level - inverted)	8.7400	0.2400	2.0976	
E20 Exposed floor (normal)	0.0000	0.3200	0.0000	
R1 Head of roof window	1.5000	0.0800	0.1200	
R2 Sill of roof window	1.5000	0.0600	0.0900	
R3 Jamb of roof window	3.6000	0.0800	0.2880	
R4 Ridge (vaulted ceiling)	10.3100	0.0800	0.8248	
R7 Flat ceiling (inverted)	2.9600	0.0400	0.1184	
R9 Roof to wall (flat ceiling)	6.5800	0.0400	0.2632	

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

Point Thermal Bridges

Total fabric heat loss

$$(36a) = 27.2486 (36)$$
$$(33) + (36) + (36a) = 136.3707 (37)$$

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

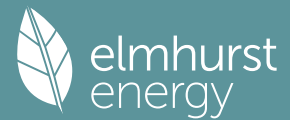
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	95.5222	95.1065	94.6990	92.7852	92.4271	90.7602	90.7602	90.4515	91.4022	92.4271	93.1515	93.9088	(38)
Heat transfer coeff	231.8929	231.4772	231.0697	229.1559	228.7978	227.1309	227.1309	226.8222	227.7729	228.7978	229.5222	230.2795	(39)
Average = Sum(39)m / 12 =													229.1541

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1942	1.1920	1.1899	1.1801	1.1782	1.1696	1.1696	1.1680	1.1729	1.1782	1.1819	1.1858	(40)
HLP (average)												1.1801	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.9944 (42)	
Hot water usage for mixer showers													
74.4254	73.3069	71.6771	68.5587	66.2574	63.6910	62.2323	63.8498	65.6229	68.3784	71.5637	74.1402 (42a)		
Hot water usage for baths													
32.1286	31.6514	30.9795	29.7406	28.8129	27.7842	27.2286	27.8958	28.6223	29.7230	30.9874	32.0199 (42b)		
Hot water usage for other uses													
45.2952	43.6481	42.0010	40.3539	38.7068	37.0597	37.0597	38.7068	40.3539	42.0010	43.6481	45.2952 (42c)		
Average daily hot water use (litres/day)												139.5834 (43)	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use													
151.8491	148.6064	144.6576	138.6532	133.7771	128.5349	126.5206	130.4524	134.5991	140.1024	146.1993	151.4554 (44)		
Energy content (annual)	240.4919	211.6136	222.3333	189.8092	180.0897	158.0487	153.0157	161.5273	165.9741	190.1176	208.2877	237.1425 (45)	
Total = Sum(45)m =											2318.4512		
Distribution loss (46)m = 0.15 x (45)m													
36.0738	31.7420	33.3500	28.4714	27.0134	23.7073	22.9524	24.2291	24.8961	28.5176	31.2432	35.5714 (46)		
Water storage loss (or HIU loss):													
Store volume												200.0000 (47)	
a) If manufacturer declared loss factor is known (kWh/day):												1.6525 (48)	
Temperature factor from Table 2b												0.5400 (49)	
Enter (49) or (54) in (55)												0.8924 (55)	
Total storage loss													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (56)		
If cylinder contains dedicated solar storage													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (57)		
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624 (59)		

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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													
	291.4180	257.6113	273.2593	239.0925	231.0157	207.3320	203.9417	212.4534	215.2574	241.0437	257.5710	288.0686 (62)	
WWHRS	-34.0242	-30.0913	-31.5098	-26.0914	-24.3162	-20.8076	-19.5038	-20.7403	-21.5283	-25.3795	-28.7519	-33.3941 (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													
	257.3938	227.5200	241.7495	213.0011	206.6995	186.5244	184.4380	191.7131	193.7291	215.6642	228.8191	254.6745 (64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =			2601.9263 (64)
Electric shower(s)													2602 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)	
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												0.0000 (64a)	
Heat gains from water heating, kWh/month													
	120.7044	107.1597	114.6667	102.5382	100.6207	91.9778	91.6186	94.4487	94.6130	103.9550	108.6823	119.5907 (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	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178	149.7178 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	184.3475	204.0991	184.3475	190.4925	184.3475	190.4925	184.3475	184.3475	190.4925	184.3475	190.4925	184.3475 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	365.4896	369.2823	359.7249	339.3785	313.6948	289.5558	273.4294	269.6368	279.1941	299.5405	325.2242	349.3633 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718	37.9718 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742	-119.7742 (71)
Water heating gains (Table 5)												
	162.2371	159.4638	154.1219	142.4142	135.2428	127.7470	123.1432	126.9472	131.4070	139.7244	150.9476	160.7402 (72)
Total internal gains												
	782.9896	803.7605	769.1097	743.2005	704.2006	675.7106	648.8355	648.8468	669.0089	694.5278	737.5796	765.3664 (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
North						17.5400	10.6334	0.6300	0.7000	0.7700		56.9998 (74)
East						2.5900	19.6403	0.6300	0.7000	0.7700		15.5460 (76)
Southeast						3.3000	36.7938	0.6300	0.7000	0.7700		37.1074 (77)
South						14.7900	46.7521	0.6300	0.7000	0.7700		211.3201 (78)
Southwest						1.1000	36.7938	0.6300	0.7000	0.7700		12.3691 (79)
West						4.1100	19.6403	0.6300	0.7000	0.7700		24.6695 (80)
North						1.3600	26.0000	0.6300	0.7000	1.0000		14.0344 (82)
Solar gains	372.0464	647.1127	922.6415	1208.3732	1414.9705	1432.3211	1369.3922	1210.6908	1020.6871	725.0730	448.0214	316.8662 (83)
Total gains	1155.0360	1450.8733	1691.7512	1951.5738	2119.1711	2108.0316	2018.2277	1859.5376	1689.6960	1419.6008	1185.6010	1082.2326 (84)

7. Mean internal temperature (heating season)

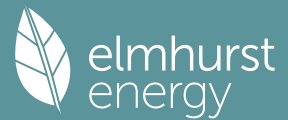
Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	58.1536	58.2581	58.3608	58.8482	58.9403	59.3729	59.3729	59.4537	59.2055	58.9403	58.7543	58.5611
alpha	4.8769	4.8839	4.8907	4.9232	4.9294	4.9582	4.9582	4.9636	4.9470	4.9294	4.9170	4.9041
util living area												
	0.9981	0.9939	0.9822	0.9399	0.8330	0.6515	0.4874	0.5466	0.8004	0.9668	0.9952	0.9986 (86)
MIT	19.5106	19.7483	20.0744	20.4848	20.8009	20.9559	20.9914	20.9852	20.8795	20.4470	19.8966	19.4710 (87)
Th 2	19.9247	19.9264	19.9281	19.9360	19.9375	19.9444	19.9444	19.9457	19.9417	19.9375	19.9345	19.9313 (88)
util rest of house												
	0.9974	0.9918	0.9759	0.9188	0.7792	0.5594	0.3745	0.4286	0.7198	0.9509	0.9932	0.9981 (89)
MIT 2	18.1882	18.4928	18.9071	19.4175	19.7729	19.9199	19.9417	19.9406	19.8611	19.3832	18.6891	18.1421 (90)
Living area fraction												
	18.3169	18.6150	19.0207	19.5214	19.8730	20.0207	20.0439	20.0423	19.9602	19.4867	18.8067	18.2715 (92)
MIT												
Temperature adjustment												
	18.3169	18.6150	19.0207	19.5214	19.8730	20.0207	20.0439	20.0423	19.9602	19.4867	18.8067	18.2715 (93)
adjusted MIT												

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9958	0.9880	0.9686	0.9085	0.7755	0.5665	0.3854	0.4398	0.7214	0.9417	0.9899	0.9969 (94)
Useful gains	1150.2331	1433.4996	1638.5706	1772.9135	1643.3481	1194.1139	777.8396	817.8954	1218.9580	1336.8609	1173.6470	1078.9000 (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												
	3250.4160	3174.7184	2893.1580	2433.9579	1869.9579	1231.2175	782.2138	826.1455	1334.7902	2033.2686	2686.9387	3240.3670 (97)
Space heating kWh												
	1562.5361	1170.0990	933.4130	475.9519	168.5977	0.0000	0.0000	0.0000	0.0000	518.1273	1089.5701	1608.1315 (98a)
Space heating requirement - total per year (kWh/year)												
												7526.4265
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												
	1562.5361	1170.0990	933.4130	475.9519	168.5977	0.0000	0.0000	0.0000	0.0000	518.1273	1089.5701	1608.1315 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												
												7526.4265
Space heating per m ²											(98c) / (4) =	
											38.7581 (99)	

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

Full SAP Calculation Printout



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	1562.5361	1170.0990	933.4130	475.9519	168.5977	0.0000	0.0000	0.0000	0.0000	518.1273	1089.5701	1608.1315	(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)	1692.8885	1267.7129	1011.2817	515.6575	182.6627	0.0000	0.0000	0.0000	0.0000	561.3514	1180.4659	1742.2876	(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	257.3938	227.5200	241.7495	213.0011	206.6995	186.5244	184.4380	191.7131	193.7291	215.6642	228.8191	254.6745	(64)
Efficiency of water heater	87.4058	87.1990	86.7865	85.8080	83.6067	79.8000	79.8000	79.8000	79.8000	85.9510	87.0952	79.8000	(216)
Fuel for water heating, kWh/month	294.4814	260.9204	278.5567	248.2299	247.2284	233.7399	231.1253	240.2420	242.7683	250.9153	262.7230	291.2177	(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	38.3038	30.7287	27.6678	20.2706	15.6576	12.7924	14.2834	18.5661	24.1155	31.6409	35.7383	39.3684	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-72.8025	-100.1547	-140.4664	-153.8745	-162.4305	-150.1796	-148.0927	-141.3454	-129.1674	-112.3386	-79.0528	-63.2170	(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	-49.0626	-102.1811	-201.3085	-299.8979	-394.3236	-395.5871	-391.1451	-332.3815	-245.0833	-145.5642	-65.2977	-38.8962	(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												8154.3082	(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												3082.1482	(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)												309.1334	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-4113.8513	(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												7517.7386	(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	8154.3082	0.2100	1712.4047	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3082.1482	0.2100	647.2511	(264)
Space and water heating			2359.6559	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	309.1334	0.1443	44.6175	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1453.1223	0.1352	-196.3962	
PV Unit electricity exported	-2660.7289	0.1261	-335.5858	
Total			-531.9819	(269)
Total CO2, kg/year			1884.2207	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.7000	(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	8154.3082	1.1300	9214.3683	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3082.1482	1.1300	3482.8275	(278)
Space and water heating			12697.1958	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	309.1334	1.5338	474.1592	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1453.1223	1.4995	-2179.0155	
PV Unit electricity exported	-2660.7289	0.4630	-1231.8554	
Total			-3410.8709	(283)
Total Primary energy kWh/year			9890.5848	(286)
Target Primary Energy Rate (TPER)			50.9300	(287)

Summary for Input Data

Plot Reference	AT10	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	82 B	DER	3.64	TER	9.90
Environmental	96 A	% DER < TER			63.23
CO ₂ Emissions (t/year)	0.58	DFEE	41.87	TFEE	43.57
Compliance Check	See BREL	% DFEE < TFEE			3.92
% DPER < TPER	26.53	DPER	38.12	TPER	51.88

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	3	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	No	

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	38.84 m	74.74 m ²	2.61 m
	2nd Storey:	32.18 m	62.90 m ²	2.69 m
		14.32 m	38.46 m ²	2.38 m

8.0 Living Area	15.64	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
	WT03 Dormer	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		7.40	4.44	0.00	None	2.96	Enter Gross Area
	WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		206.88	170.41	0.00	None	36.47	Enter Gross Area

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
	RT01 Ceiling	External Plane	Plasterboard, insulated at ceiling level	0.11	9.00	2.62	2.62	None	0.00	Enter Gross Area	0.00
	RT03 Flat	External Flat	Plasterboard, insulated flat roof	0.11	9.00	11.84	10.76	None	0.00	Enter Gross Area	1.08
	RT02 Rafter	External Slope	Plasterboard, insulated slope	0.11	9.00	93.34	91.30	None	0.00	Enter Gross Area	2.04

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	74.74

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT02 Tile hung	South East	2.10	
D002	DG Win	WT02 Tile hung	North West	5.22	
W001	DG Win	WT02 Tile hung	South East	2.72	
W002	DG Win	WT02 Tile hung	South East	2.72	
W003	DG Win	WT02 Tile hung	South West	2.72	
W004	DG Win	WT02 Tile hung	North East	1.68	
W005	DG Win	WT02 Tile hung	North East	2.39	
D003	DG Win	WT02 Tile hung	North West	2.10	
W006	DG Win	WT02 Tile hung	South East	1.48	
W008	DG Win	WT02 Tile hung	South East	1.48	
W009	DG Win	WT02 Tile hung	North West	2.17	
W007	DG Win	WT02 Tile hung	South East	1.48	
W010	DG Win	WT02 Tile hung	North West	0.82	
W011	DG Win	WT02 Tile hung	North West	2.17	
W012	DG Win	WT03 Dormer	South East	1.48	
W013	DG Win	WT03 Dormer	South East	1.48	
RL01	Roof light	RT02 Rafter	North West	0.68	0
RL02	Roof light	RT02 Rafter	North West	0.68	0
D004	DG Win	WT02 Tile hung	North West	5.22	
RL03	Roof light	RT02 Rafter	North West	0.68	0
RL04	Roof light	RT03 Flat	North West	1.08	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	Calculate Bridges
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17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	25.90	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	18.93	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	50.40	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	38.84	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	36.42	0.00	0.00 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	18.78	0.04	0.04 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	13.40	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	23.81	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	2.61	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	4.06	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	3.56	0.24	0.24 Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	0.00	0.32	0.32 Table R2	No
R1 Head of roof window	Non Gov Approved Schemes	2.25	0.08	0.08 Table R2	No
R2 Sill of roof window	Non Gov Approved Schemes	2.25	0.06	0.06 Table R2	No
R3 Jamb of roof window	Non Gov Approved Schemes	5.40	0.08	0.08 Table R2	No
R4 Ridge (vaulted ceiling)	Non Gov Approved Schemes	9.39	0.08	0.08 Table R2	No
R7 Flat ceiling (inverted)	Non Gov Approved Schemes	2.96	0.04	0.04 Table R2	No
R9 Roof to wall (flat ceiling)	Non Gov Approved Schemes	6.52	0.04	0.04 Table R2	No
E14 Flat roof	Non Gov Approved Schemes	10.19	0.08	0.08 Table R2	No

Y-value	0.05	W/m ² K
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19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)

Summary for Input Data

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				
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 Fixed Lighting	No				
	Name LEL	Efficacy 85.00	Power 10.00	Capacity 850.00	Count 20
24.0 Main Heating 1					
	SAP table				
Percentage of Heat	100.00 %				
Fuel Type	Electricity				
SAP Code	214				
In Winter	249.90				
In Summer	175.10				
Controls SAP Code	2207				
Controls description	Time and temperature zone control by arrangement				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators and Underfloor				
Underfloor Heating	Yes - Pipes in thin screed				
Flow Temperature	Enter value				
Flow Temperature Value	35.00				
25.0 Main Heating 2					
	None				
26.0 Heat Networks					
	None				
27.0 Secondary Heating					
	None				
28.0 Water Heating					
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 mains				

Summary for Input Data

Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



Plot Reference	AT10				Issued on Date	07/05/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B		DER	3.64		TER	9.90
Environmental	96 A		% DER < TER				63.23
CO ₂ Emissions (t/year)	0.58		DFEE	41.87		TFEE	43.57
Compliance Check	See BREL		% DFEE < TFEE				3.92
% DPER < TPER	26.53		DPER	38.12		TPER	51.88
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001	
Client	Antler Homes PLC, Antler Homes PLC						

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	74.7400 (1b)	x 2.6100 (2b)	= 195.0714 (1b) - (3b)
First floor	62.9000 (1c)	x 2.6900 (2c)	= 169.2010 (1c) - (3c)
Second floor	38.4600 (1d)	x 2.3800 (2d)	= 91.5348 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	176.1000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 455.8072 (5)

2. Ventilation rate

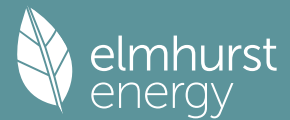
	m ³ per hour	
Number of open chimneys	0 * 80 =	0.0000 (6a)
Number of open flues	0 * 20 =	0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 =	0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 =	0.0000 (6d)
Number of flues attached to other heater	0 * 35 =	0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			37.3300	1.1450	42.7443		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof light			3.1200	1.1450	3.5725		(27a)
FT01			74.7400	0.1300	9.7162		(28a)
WT03 Dormer	7.4000	2.9600	4.4400	0.1800	0.7992		(29a)
WT02 Tile hung	206.8800	36.4700	170.4100	0.1800	30.6738		(29a)
RT01 Ceiling	2.6200		2.6200	0.1100	0.2882		(30)
RT03 Flat	11.8400	1.0800	10.7600	0.1100	1.1836		(30)
RT02 Rafter	93.3400	2.0400	91.3000	0.1100	10.0430		(30)
Total net area of external elements Aum(A, m ²)			396.8200				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		101.1208		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)

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List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	25.9000	0.0500	1.2950
E3 Sill	18.9300	0.0500	0.9465
E4 Jamb	50.4000	0.0500	2.5200
E5 Ground floor (normal)	38.8400	0.1600	6.2144
E6 Intermediate floor within a dwelling	36.4200	0.0000	0.0000
E11 Eaves (insulation at rafter level)	18.7800	0.0400	0.7512
E13 Gable (insulation at rafter level)	13.4000	0.0800	1.0720
E16 Corner (normal)	23.8100	0.0900	2.1429
E17 Corner (inverted - internal area greater than external area)	2.6100	-0.0900	-0.2349
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	4.0600	0.5600	2.2736
E24 Eaves (insulation at ceiling level - inverted)	3.5600	0.2400	0.8544
E20 Exposed floor (normal)	0.0000	0.3200	0.0000
R1 Head of roof window	2.2500	0.0800	0.1800
R2 Sill of roof window	2.2500	0.0600	0.1350
R3 Jamb of roof window	5.4000	0.0800	0.4320
R4 Ridge (vaulted ceiling)	9.3900	0.0800	0.7512
R7 Flat ceiling (inverted)	2.9600	0.0400	0.1184
R9 Roof to wall (flat ceiling)	6.5200	0.0400	0.2608
E14 Flat roof	10.1900	0.0800	0.8152
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			20.5277 (36)
Point Thermal bridges			0.0000 (36a) =
Total fabric heat loss		(33) + (36) + (36a) =	121.6485 (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	40.0954	39.6159	39.1365	36.7392	36.2597	33.8625	33.8625	33.3830	34.8214	36.2597	37.2187	38.1776 (38)
Average = Sum(39)m / 12 =	161.7439	161.2644	160.7850	158.3877	157.9082	155.5110	155.5110	155.0315	156.4699	157.9082	158.8671	159.8261 (39)
												158.2678
HLP	0.9185	0.9158	0.9130	0.8994	0.8967	0.8831	0.8831	0.8804	0.8885	0.8967	0.9021	0.9076 (40)
HLP (average)												0.8987
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

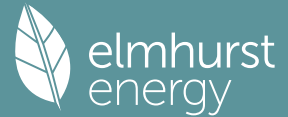
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9707 (42)
Hot water usage for mixer showers	74.0284	72.9159	71.2947	68.1930	65.9040	63.3513	61.9003	63.5092	65.2728	68.0136	71.1820	73.7447	(42a)
Hot water usage for baths	31.9578	31.4832	30.8149	29.5825	28.6598	27.6366	27.0839	27.7476	28.4702	29.5651	30.8228	31.8498	(42b)
Hot water usage for other uses	45.0527	43.4144	41.7762	40.1379	38.4996	36.8613	36.8613	38.4996	40.1379	41.7762	43.4144	45.0527	(42c)
Average daily hot water use (litres/day)													138.8387 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	151.0389	147.8135	143.8858	137.9134	133.0633	127.8492	125.8455	129.7564	133.8809	139.3549	145.4192	150.6473	(44)
Energy content (annual)	239.2088	210.4845	221.1471	188.7965	179.1288	157.2055	152.1993	160.6655	165.0885	189.1032	207.1763	235.8772	(45)
Energy content (annual)										Total = Sum(45)m =		2306.0813	
Distribution loss (46)m = 0.15 x (45)m	35.8813	31.5727	33.1721	28.3195	26.8693	23.5808	22.8299	24.0998	24.7633	28.3655	31.0765	35.3816	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.7200 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.9288 (55)
Total storage loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(56)
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980	(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	305.2995	270.1794	287.2378	252.7553	245.2196	221.1643	218.2900	226.7563	229.0473	255.1940	271.1351	301.9680	(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	305.2995	270.1794	287.2378	252.7553	245.2196	221.1643	218.2900	226.7563	229.0473	255.1940	271.1351	301.9680	(64)
										Total per year (kWh/year) = Sum(64)m =		3084.2467	(64)
12Total per year (kWh/year)												3084	(64)
Electric shower(s)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
													0.0000 (64a)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =													
Heat gains from water heating, kWh/month	132.4095	117.7420	126.4040	113.9419	112.4329	103.4379	103.4789	106.2939	106.0590	115.7494	120.0532	131.3018	(65)

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

Metabolic gains (Table 5), Watts												
(66)m	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	175.3852	194.1765	175.3852	181.2314	175.3852	181.2314	175.3852	175.3852	181.2314	175.3852	181.2314	175.3852 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	347.7208	351.3290	342.2363	322.8791	298.4440	275.4785	260.1362	256.5279	265.6206	284.9779	309.4129	332.3784 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272 (71)
Water heating gains (Table 5)	177.9698	175.2113	169.8979	158.2526	151.1195	143.6637	139.0845	142.8681	147.3041	155.5772	166.7405	176.4809 (72)
Total internal gains												

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771.6359 791.2770 758.0796 732.9233 695.5090 667.9338 642.1661 642.3414 661.7163 686.5004 727.9450 754.8047 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b		FF Specific data or Table 6c		Access factor Table 6d		Gains W
Northeast				4.0700	11.2829	0.6300		0.7000		0.7700		14.0342 (75)
Southeast				12.8400	36.7938	0.6300		0.7000		0.7700		144.3816 (77)
Southwest				2.7200	36.7938	0.6300		0.7000		0.7700		30.5855 (79)
Northwest				17.7000	11.2829	0.6300		0.7000		0.7700		61.0334 (81)
Northwest				3.1200	26.0000	0.6300		0.7000		1.0000		32.1965 (82)
Solar gains	282.2313	517.7057	801.9634	1143.1353	1411.4379	1457.4274	1381.8353	1174.0307	919.4089	597.8569	344.8896	237.0443 (83)
Total gains	1053.8672	1308.9827	1560.0429	1876.0586	2106.9469	2125.3611	2024.0014	1816.3721	1581.1252	1284.3573	1072.8346	991.8489 (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	75.6082	75.8330	76.0591	77.2103	77.4448	78.6386	78.6386	78.8818	78.1567	77.4448	76.9773	76.5155
alpha	6.0405	6.0555	6.0706	6.1474	6.1630	6.2426	6.2426	6.2588	6.2104	6.1630	6.1318	6.1010
util living area	0.9979	0.9921	0.9693	0.8691	0.6723	0.4661	0.3378	0.3919	0.6612	0.9421	0.9938	0.9986 (86)
MIT	20.1624	20.3299	20.5580	20.8127	20.9247	20.9480	20.9500	20.9498	20.9336	20.7428	20.4033	20.1397 (87)
Th 2	20.1518	20.1541	20.1564	20.1680	20.1703	20.1819	20.1819	20.1842	20.1773	20.1703	20.1657	20.1611 (88)
util rest of house	0.9973	0.9896	0.9601	0.8377	0.6202	0.4075	0.2751	0.3228	0.5910	0.9199	0.9915	0.9981 (89)
MIT 2	19.1605	19.3757	19.6635	19.9724	20.0867	20.1169	20.1180	20.1203	20.1029	19.9032	19.4798	19.1390 (90)
Living area fraction	19.2495	19.4604	19.7429	20.0470	20.1611	20.1907	20.1919	20.1940	20.1767	19.9777	19.5618	0.0888 (91)
MIT	19.2495	19.4604	19.7429	20.0470	20.1611	20.1907	20.1919	20.1940	20.1767	19.9777	19.5618	19.2279 (92)
Temperature adjustment												0.0000
adjusted MIT	19.2495	19.4604	19.7429	20.0470	20.1611	20.1907	20.1919	20.1940	20.1767	19.9777	19.5618	19.2279 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9963	0.9869	0.9545	0.8327	0.6196	0.4082	0.2759	0.3236	0.5909	0.9137	0.9892	0.9973 (94)
Useful gains	1049.9153	1291.8746	1489.0643	1562.1462	1305.3940	867.4736	558.4458	587.8481	934.2915	1173.4858	1061.2079	989.2033 (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	2417.9878	2348.0814	2129.2616	1765.5487	1336.0802	869.4146	558.5766	588.1907	950.8201	1480.8212	1979.7734	2401.8445 (97)
Space heating kWh	1017.8460	709.7709	476.3068	146.4498	22.8305	0.0000	0.0000	0.0000	0.0000	228.6575	661.3672	1051.0050 (98a)
Space heating requirement - total per year (kWh/year)												4314.2339
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	1017.8460	709.7709	476.3068	146.4498	22.8305	0.0000	0.0000	0.0000	0.0000	228.6575	661.3672	1051.0050 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												4314.2339
Space heating per m2										(98c) / (4) =		24.4988 (99)

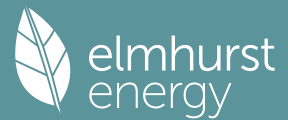
9a. Energy requirements - Individual heating systems, including micro-CHP

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 %)												249.9000 (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	1017.8460	709.7709	476.3068	146.4498	22.8305	0.0000	0.0000	0.0000	0.0000	228.6575	661.3672	1051.0050 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)	407.3013	284.0220	190.5990	58.6034	9.1359	0.0000	0.0000	0.0000	0.0000	91.4996	264.6527	420.5702 (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	305.2995	270.1794	287.2378	252.7553	245.2196	221.1643	218.2900	226.7563	229.0473	255.1940	271.1351	301.9680 (64)
Efficiency of water heater	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)
Fuel for water heating, kWh/month	174.3572	154.3000	164.0422	144.3491	140.0455	126.3074	124.6659	129.5010	130.8095	145.7419	154.8459	172.4546 (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	46.9457	42.4026	46.9457	45.4314	46.9457	45.4314	46.9457	46.9457	45.4314	46.9457	45.4314	46.9457 (231)
Lighting	37.6371	30.1939	27.1862	19.9178	15.3851	12.5697	14.0348	18.2430	23.6958	31.0902	35.1163	38.6832 (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)

elmhurst
energy

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	4 * 10 =	40.0000	(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) =		Air changes per hour	
Pressure test	40.0000 / (5) =	0.0878	(8)
Pressure Test Method		Yes	
Measured/design AP50		Blower Door	
		5.0000	(17)

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Infiltration rate	0.3378	(18)
Number of sides sheltered	2	(19)
Shelter factor	(20) = $1 - [0.075 \times (19)]$	= 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20)	= 0.2871 (21)

Wind speed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind factor	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)
Adj infiltr rate	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)
Effective ac	0.3660	0.3589	0.3517	0.3158	0.3086	0.2727	0.2727	0.2656	0.2871	0.3086	0.3230	0.3373	(22b)
	0.5670	0.5644	0.5618	0.5499	0.5476	0.5372	0.5372	0.5353	0.5412	0.5476	0.5522	0.5569	(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			2.1000	1.0000	2.1000			(26)
TER Opening Type			37.3300	1.1450	42.7443			(27)
TER Roof Window			3.1200	1.1450	4.9663			(27a)
FT01			74.7400	0.1300	9.7162			(28a)
WT03 Dormer	7.4000	2.9600	4.4400	0.1800	0.7992			(29a)
WT02 Tile hung	206.8800	36.4700	170.4100	0.1800	30.6738			(29a)
RT01 Ceiling	2.6200		2.6200	0.1100	0.2882			(30)
RT03 Flat	11.8400	1.0800	10.7600	0.1100	1.1836			(30)
RT02 Rafter	93.3400	2.0400	91.3000	0.1100	10.0430			(30)
Total net area of external elements Aum(A, m2)			396.8200					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	102.5146			(33)

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

250.0000 (35)

List of Thermal Bridges

	Length	Psi-value	Total	
K1 Element	0.0000	0.0500	0.0000	
E1 Steel lintel with perforated steel base plate	25.9000	0.0500	1.2950	
E2 Other lintels (including other steel lintels)	18.9300	0.0500	0.9465	
E3 Sill	50.4000	0.0500	2.5200	
E4 Jamb	38.8400	0.1600	6.2144	
E5 Ground floor (normal)	36.4200	0.0000	0.0000	
E6 Intermediate floor within a dwelling	18.7800	0.0400	0.7512	
E11 Eaves (insulation at rafter level)	13.4000	0.0800	1.0720	
E13 Gable (insulation at rafter level)	23.8100	0.0900	2.1429	
E16 Corner (normal)	2.6100	-0.0900	-0.2349	
E17 Corner (inverted - internal area greater than external area)	0.0000	0.0600	0.0000	
E18 Party wall between dwellings	0.0000	0.0800	0.0000	
P1 Party wall - Ground floor	0.0000	0.0000	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	4.0600	0.5600	2.2736	
E24 Eaves (insulation at ceiling level - inverted)	3.5600	0.2400	0.8544	
E20 Exposed floor (normal)	0.0000	0.3200	0.0000	
R1 Head of roof window	2.2500	0.0800	0.1800	
R2 Sill of roof window	2.2500	0.0600	0.1350	
R3 Jamb of roof window	5.4000	0.0800	0.4320	
R4 Ridge (vaulted ceiling)	9.3900	0.0800	0.7512	
R7 Flat ceiling (inverted)	2.9600	0.0400	0.1184	
R9 Roof to wall (flat ceiling)	6.5200	0.0400	0.2608	
E14 Flat roof	10.1900	0.0800	0.8152	

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

20.5277 (36)

Point Thermal Bridges

(36a) = 0.0000

Total fabric heat loss

(33) + (36) + (36a) = 123.0423 (37)

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)m \times (5)$

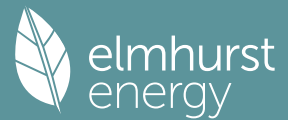
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	85.2852	84.8939	84.5103	82.7088	82.3717	80.8026	80.8026	80.5121	81.4070	82.3717	83.0536	83.7665	(38)
Average = Sum(39)m / 12 =	208.3274	207.9361	207.5526	205.7510	205.4140	203.8449	203.8449	203.5543	204.4493	205.4140	206.0959	206.8087	(39)
												205.7494	

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.1830	1.1808	1.1786	1.1684	1.1665	1.1576	1.1576	1.1559	1.1610	1.1665	1.1703	1.1744	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.9707	(42)
Hot water usage for mixer showers														
	74.0284	72.9159	71.2947	68.1930	65.9040	63.3513	61.9003	63.5092	65.2728	68.0136	71.1820	73.7447	(42a)	
Hot water usage for baths														
	31.9578	31.4832	30.8149	29.5825	28.6598	27.6366	27.0839	27.7476	28.4702	29.5651	30.8228	31.8498	(42b)	
Hot water usage for other uses														
	45.0527	43.4144	41.7762	40.1379	38.4996	36.8613	36.8613	38.4996	40.1379	41.7762	43.4144	45.0527	(42c)	
Average daily hot water use (litres/day)													138.8387	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
	151.0389	147.8135	143.8858	137.9134	133.0633	127.8492	125.8455	129.7564	133.8809	139.3549	145.4192	150.6473	(44)	
Energy conte	239.2088	210.4845	221.1471	188.7965	179.1288	157.2055	152.1993	160.6655	165.0885	189.1032	207.1763	235.8772	(45)	
Energy content (annual)										Total = Sum(45)m =		2306.0813		
Distribution loss (46)m = $0.15 \times (45)m$														
	35.8813	31.5727	33.1721	28.3195	26.8693	23.5808	22.8299	24.0998	24.7633	28.3655	31.0765	35.3816	(46)	
Water storage loss (or HIU loss):														
Store volume													200.0000	(47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6525	(48)
Temperature factor from Table 2b													0.5400	(49)
Enter (49) or (54) in (55)													0.8924	(55)
Total storage loss														
	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)	
If cylinder contains dedicated solar storage														
	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(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														

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WWHRS	290.1348	256.4822	272.0731	238.0798	230.0549	206.4888	203.1254	211.5916	214.3718	240.0293	256.4596	286.8033 (62)
PV diverter	-33.8427	-29.9307	-31.3417	-25.9522	-24.1865	-20.6966	-19.3997	-20.6297	-21.4135	-25.2441	-28.5985	-33.2160 (63a)
Solar input	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)
12Total per year (kWh/year)	256.2922	226.5515	240.7314	212.1276	205.8684	185.7922	183.7256	190.9619	192.9584	214.7852	227.8611	253.5873 (64)
Electric shower(s)												2591.2426 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2591 (64)
Heat gains from water heating, kWh/month	120.2778	106.7843	114.2723	102.2015	100.3012	91.6975	91.3471	94.1621	94.3186	103.6177	108.3128	119.1700 (65)

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339	148.5339 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	175.3852	194.1765	175.3852	181.2314	175.3852	181.2314	175.3852	175.3852	181.2314	175.3852	181.2314	175.3852 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	347.7208	351.3290	342.2363	322.8791	298.4440	275.4785	260.1362	256.5279	265.6206	284.9779	309.4129	332.3784 (68)
Pumps, fans	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534	37.8534 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272	-118.8272 (71)
Total internal gains	161.6637	158.9052	153.5917	141.9465	134.8134	127.3576	122.7784	126.5620	130.9980	139.2711	150.4344	160.1748 (72)
	755.3298	774.9708	741.7734	716.6171	679.2028	651.6277	625.8599	626.0353	645.4102	670.1943	711.6389	738.4985 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c		Access factor Table 6d		Gains W	
Northeast				4.0700	11.2829	0.6300	0.7000		0.7700		14.0342 (75)	
Southeast				12.8400	36.7938	0.6300	0.7000		0.7700		144.3816 (77)	
Southwest				2.7200	36.7938	0.6300	0.7000		0.7700		30.5855 (79)	
Northwest				17.7000	11.2829	0.6300	0.7000		0.7700		61.0334 (81)	
Northwest				3.1200	26.0000	0.6300	0.7000		1.0000		32.1965 (82)	
Solar gains	282.2313	517.7057	801.9634	1143.1353	1411.4379	1457.4274	1381.8353	1174.0307	919.4089	597.8569	344.8896	237.0443 (83)
Total gains	1037.5611	1292.6766	1543.7368	1859.7525	2090.6408	2109.0550	2007.6953	1800.0660	1564.8191	1268.0512	1056.5284	975.5428 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
tau	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
alpha	58.7017	58.8121	58.9208	59.4367	59.5342	59.9925	59.9925	60.0781	59.8152	59.5342	59.3373	59.1327
util living area	4.9134	4.9208	4.9281	4.9624	4.9689	4.9995	4.9995	5.0052	4.9877	4.9689	4.9558	4.9422
	0.9982	0.9943	0.9815	0.9278	0.7928	0.5959	0.4423	0.5105	0.7870	0.9681	0.9955	0.9986 (86)
MIT	19.5215	19.7515	20.0951	20.5364	20.8466	20.9710	20.9946	20.9894	20.8912	20.4485	19.9005	19.4848 (87)
Th 2	19.9336	19.9354	19.9372	19.9454	19.9469	19.9541	19.9541	19.9554	19.9513	19.9469	19.9438	19.9405 (88)
util rest of house	0.9975	0.9924	0.9750	0.9037	0.7347	0.5080	0.3395	0.3995	0.7055	0.9528	0.9936	0.9982 (89)
MIT 2	18.2084	18.5034	18.9396	19.4845	19.8239	19.9386	19.9525	19.9519	19.8794	19.3926	18.7008	18.1663 (90)
Living area fraction									fLA = Living area / (4) =			0.0888 (91)
MIT	18.3250	18.6142	19.0423	19.5779	19.9147	20.0303	20.0450	20.0440	19.9692	19.4864	18.8073	18.2834 (92)
Temperature adjustment												0.0000
adjusted MIT	18.3250	18.6142	19.0423	19.5779	19.9147	20.0303	20.0450	20.0440	19.9692	19.4864	18.8073	18.2834 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9960	0.9888	0.9675	0.8934	0.7327	0.5147	0.3486	0.4092	0.7071	0.9436	0.9905	0.9970 (94)
Ext temp.	1033.4193	1278.1414	1493.6308	1661.4931	1531.9079	1085.5284	699.8586	736.5774	1106.4535	1196.5821	1046.5396	972.6249 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Space heating kWh	2921.8019	2851.6825	2603.1765	2196.9993	1687.4137	1106.9292	702.2550	741.7604	1199.9627	1825.3890	2412.8313	2912.5726 (97)
Space heating requirement - total per year (kWh/year)	1404.9567	1057.4196	825.5020	385.5644	115.6963	0.0000	0.0000	0.0000	0.0000	467.8323	983.7300	1443.3211 (98a)
Solar heating kWh												6684.0224
Solar heating contribution - total per year (kWh/year)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Space heating kWh	1404.9567	1057.4196	825.5020	385.5644	115.6963	0.0000	0.0000	0.0000	0.0000	467.8323	983.7300	1443.3211 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												6684.0224
Space heating per m ²												37.9558 (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)

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Efficiency of secondary/supplementary heating system, %												0.0000 (208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Space heating requirement	1404.9567	1057.4196	825.5020	385.5644	115.6963	0.0000	0.0000	0.0000	0.0000	467.8323	983.7300	1443.3211 (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)	1522.1632	1145.6334	894.3683	417.7296	125.3481	0.0000	0.0000	0.0000	0.0000	506.8606	1065.7963	1563.7282 (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 requirement	256.2922	226.5515	240.7314	212.1276	205.8684	185.7922	183.7256	190.9619	192.9584	214.7852	227.8611	253.5873 (64)
Efficiency of water heater (217)m	87.2813	87.0674	86.5950	85.3824	82.8201	79.8000	79.8000	79.8000	79.8000	85.7568	86.9556	79.8000 (216)
Fuel for water heating, kWh/month	293.6391	260.2025	277.9969	248.4443	248.5731	232.8223	230.2326	239.3006	241.8025	250.4585	262.0430	87.3282 (217)
Space cooling fuel requirement												290.3844 (219)
(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	36.4416	29.2348	26.3227	19.2851	14.8964	12.1705	13.5890	17.6635	22.9431	30.1026	34.0008	37.4544 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	-66.4089	-91.8833	-129.6028	-142.8232	-151.4836	-140.3338	-138.4073	-131.7632	-119.8589	-103.4863	-72.3077	-57.6041 (233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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)	-43.0251	-89.8130	-177.3088	-264.6615	-348.4780	-349.7612	-345.8248	-293.6405	-216.2158	-128.1088	-57.3181	-34.0929 (233b)
Electricity generated by wind turbines (Appendix M) (negative quantity)	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)	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)	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												7241.6278 (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												3075.8999 (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)												294.1044 (232)
Energy saving/generation technologies (Appendices M ,N and Q)												
PV generation												-3694.2118 (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												7003.4203 (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	7241.6278	0.2100	1520.7418 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	3075.8999	0.2100	645.9390 (264)
Space and water heating			2166.6808 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	294.1044	0.1443	42.4484 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1345.9633	0.1350	-181.7404
PV Unit electricity exported	-2348.2484	0.1261	-296.0382
Total			-477.7786 (269)
Total CO2, kg/year			1743.2798 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.9000 (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	7241.6278	1.1300	8183.0394 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	3075.8999	1.1300	3475.7669 (278)
Space and water heating			11658.8063 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	294.1044	1.5338	451.1072 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1345.9633	1.4991	-2017.6783
PV Unit electricity exported	-2348.2484	0.4628	-1086.6799
Total			-3104.3582 (283)
Total Primary energy kWh/year			9135.6560 (286)
Target Primary Energy Rate (TPER)			51.8800 (287)

Summary for Input Data

Plot Reference	AT12	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	80 C	DER	4.44	TER	11.45
Environmental	96 A	% DER < TER			61.22
CO ₂ Emissions (t/year)	0.43	DFEE	42.15	TFEE	43.51
Compliance Check	See BREL	% DFEE < TFEE			3.13
% DPER < TPER	21.66	DPER	46.88	TPER	59.84

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements				
	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	31.99 m	54.22 m ²	2.61 m
		29.29 m	50.94 m ²	2.69 m

8.0 Living Area	23.89	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
WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		83.49	63.65	0.00	None	19.84	Enter Gross Area
WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		78.79	68.64	0.00	None	10.15	Enter Gross Area

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
RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	54.22	54.22	None	0.00	Enter Gross Area	0.00

Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	54.22

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Solid door	Manufacturer	Solid Door				0.63			1.00

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	South	2.10	
D002	DG Win	WT01 Brick	West	5.22	
W001	DG Win	WT01 Brick	South	1.03	
W002	DG Win	WT01 Brick	South	2.72	

Summary for Input Data

W003	DG Win	WT01 Brick	South	2.72
W004	DG Win	WT01 Brick	West	1.48
W005	DG Win	WT01 Brick	North	0.82
W006	DG Win	WT01 Brick	North	1.03
W007	DG Win	WT01 Brick	East	2.72
W008	DG Win	WT02 Tile hung	South	1.48
W009	DG Win	WT02 Tile hung	South	0.82
W010	DG Win	WT02 Tile hung	South	1.48
W011	DG Win	WT02 Tile hung	West	2.17
W012	DG Win	WT02 Tile hung	North	1.48
W013	DG Win	WT02 Tile hung	East	2.72

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	20.22	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	16.73	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	43.20	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	31.99	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	26.85	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	18.69	0.06	0.06 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	15.74	0.06	0.06 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	26.42	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	5.22	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12 Table R2	No
E15 Flat roof with parapet	Independently assessed	0.00	0.56	0.56 Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	2.44	0.24	0.24 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0

Summary for Input Data

Number of flueless gas fires	0				
21.0 Fixed Cooling System	No				
22.0 Pressure Testing	Yes				
Designed AP ₅₀	3.00	m ³ /(h.m ²) @ 50 Pa			
Test Method	Blower Door				
22.0 Lighting	No				
No Fixed Lighting	No				
	Name LEL	Efficacy 85.00	Power 10.00	Capacity 850.00	Count 20
24.0 Main Heating 1	SAP table				
Percentage of Heat	100.00				%
Fuel Type	Electricity				
SAP Code	214				
In Winter	249.90				
In Summer	175.10				
Controls SAP Code	2207				
Controls description	Time and temperature zone control by arrangement				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators and Underfloor				
Underfloor Heating	Yes - Pipes in thin screed				
Flow Temperature	Enter value				
Flow Temperature Value	35.00				
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 mains				
Bath Count	1				
Supplementary Immersion	No				
Immersion Only Heating Hot Water	No				
28.1 Showers					
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	
28.3 Waste Water Heat Recovery System					
29.0 Hot Water Cylinder	Hot Water Cylinder				
Cylinder Stat	Yes				
Cylinder In Heated Space	Yes				

Summary for Input Data

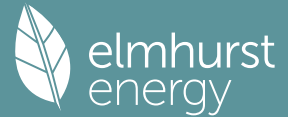
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store	None
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34.0 Small-scale Hydro	None											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations
Lower cost measures
None
Further measures to achieve even higher standards
None

Full SAP Calculation Printout



Plot Reference	AT12				Issued on Date	07/05/2026
Assessment Reference	Be Green		Plot Type Ref			
Plot Address					SAP Version	10.2
SAP Rating	80 C	DER	4.44	TER	11.45	
Environmental	96 A	% DER < TER				61.22
CO ₂ Emissions (t/year)	0.43	DFEE	42.15	TFEE	43.51	
Compliance Check	See BREL	% DFEE < TFEE				3.13
% DPER < TPER	21.66	DPER	46.88	TPER	59.84	
Assessor Details	Mr. Giles Murgatroyd				Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC					

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	54.2200 (1b)	x 2.6100 (2b)	= 141.5142 (1b) - (3b)
First floor	50.9400 (1c)	x 2.6900 (2c)	= 137.0286 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	105.1600		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 278.5428 (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)											
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			27.8900	1.1450	31.9351		(27)
Solid door			2.1000	1.0000	2.1000		(26)
FT01			54.2200	0.1300	7.0486		(28a)
WT01 Brick	83.4900	19.8400	63.6500	0.1800	11.4570		(29a)
WT02 Tile hung	78.7900	10.1500	68.6400	0.1800	12.3552		(29a)
RT01	54.2200		54.2200	0.1100	5.9642		(30)
Total net area of external elements Aum(A, m ²)			270.7200				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		70.8601		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)				20.2200	0.0500	1.0110	

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E3 Sill	16.7300	0.0500	0.8365
E4 Jamb	43.2000	0.0500	2.1600
E5 Ground floor (normal)	31.9900	0.1600	5.1184
E6 Intermediate floor within a dwelling	26.8500	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	18.6900	0.0600	1.1214
E12 Gable (insulation at ceiling level)	15.7400	0.0600	0.9444
E16 Corner (normal)	26.4200	0.0900	2.3778
E17 Corner (inverted - internal area greater than external area)	5.2200	-0.0900	-0.4698
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	0.0000	0.5600	0.0000
E24 Eaves (insulation at ceiling level - inverted)	2.4400	0.2400	0.5856
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			13.6853 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	84.5454 (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	24.5022	24.2092	23.9162	22.4512	22.1583	20.6933	20.6933	20.4003	21.2793	22.1583	22.7442	23.3302	(38)
Average = Sum(39)m / 12 =	109.0476	108.7546	108.4616	106.9967	106.7037	105.2387	105.2387	104.9457	105.8247	106.7037	107.2897	107.8756	(39)
												106.9234	
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	1.0370	1.0342	1.0314	1.0175	1.0147	1.0007	1.0007	0.9980	1.0063	1.0147	1.0203	1.0258	(40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.7824 (42)
Hot water usage for mixer showers													
	70.8721	69.8070	68.2550	65.2855	63.0941	60.6502	59.2612	60.8014	62.4898	65.1138	68.1471	70.6005	(42a)
Hot water usage for baths													
	30.6005	30.1461	29.5061	28.3261	27.4425	26.4628	25.9336	26.5691	27.2610	28.3094	29.5137	30.4971	(42b)
Hot water usage for other uses													
	43.1249	41.5567	39.9886	38.4204	36.8522	35.2840	35.2840	36.8522	38.4204	39.9886	41.5567	43.1249	(42c)
Average daily hot water use (litres/day)													132.9177 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	144.5975	141.5098	137.7497	132.0320	127.3888	122.3970	120.4788	124.2227	128.1712	133.4117	139.2175	144.2225	(44)
Energy conte	229.0072	201.5081	211.7161	180.7452	171.4898	150.5014	145.7086	153.8137	158.0480	181.0385	198.3408	225.8177	(45)
Energy content (annual)										Total = Sum(45)m =		2207.7350	
Distribution loss (46)m = 0.15 x (45)m													
	34.3511	30.2262	31.7574	27.1118	25.7235	22.5752	21.8563	23.0720	23.7072	27.1558	29.7511	33.8726	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.7200 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.9288 (55)
Total storage loss													
	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(56)
If cylinder contains dedicated solar storage													
	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928	(57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980	(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													
	295.0979	261.2030	277.8069	244.7040	237.5806	214.4602	211.7994	219.9044	222.0068	247.1292	262.2996	291.9084	(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													
	295.0979	261.2030	277.8069	244.7040	237.5806	214.4602	211.7994	219.9044	222.0068	247.1292	262.2996	291.9084	(64)
12Total per year (kWh/year)													
Electric shower(s)													2985.9004 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(64a)
													0.0000 (64a)
Heat gains from water heating, kWh/month													
	129.0175	114.7574	123.2682	111.2648	109.8930	101.2088	101.3207	104.0156	103.7180	113.0679	117.1154	127.9570	(65)

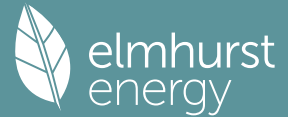
5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts													
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	(66)
	133.3645	147.6535	133.3645	137.8099	133.3645	137.8099	133.3645	133.3645	137.8099	133.3645	137.8099	133.3645	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	264.4099	267.1537	260.2395	245.5201	226.9395	209.4763	197.8099	195.0661	201.9803	216.6997	235.2803	252.7435	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	(71)
Water heating gains (Table 5)													
	173.4106	170.7699	165.6831	154.5345	147.7056	140.5677	136.1838	139.8060	144.0528	151.9730	162.6602	171.9852	(72)
Total internal gains	638.9215	653.3136	627.0236	605.6010	575.7461	552.5905	532.0946	532.9731	548.5795	569.7736	603.4870	625.8296	(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
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North			3.3300		10.6334		0.6300		0.7000		0.7700		10.8215 (74)
East			5.4400		19.6403		0.6300		0.7000		0.7700		32.6526 (76)
South			10.2500		46.7521		0.6300		0.7000		0.7700		146.4524 (78)
West			8.8700		19.6403		0.6300		0.7000		0.7700		53.2406 (80)

Solar gains	243.1671	428.5571	617.3829	805.3292	930.4658	933.9968	896.3685	802.9280	683.2407	482.6957	294.0445	206.2041	(83)
Total gains	882.0886	1081.8706	1244.4065	1410.9302	1506.2119	1486.5873	1428.4631	1335.9011	1231.8202	1052.4693	897.5315	832.0337	(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	66.9687	67.1491	67.3305	68.2524	68.4398	69.3925	69.3925	69.5862	69.0083	68.4398	68.0660	67.6963	
alpha	5.4646	5.4766	5.4887	5.5502	5.5627	5.6262	5.6262	5.6391	5.6006	5.5627	5.5377	5.5131	
util living area	0.9901	0.9714	0.9261	0.8087	0.6352	0.4502	0.3238	0.3606	0.5794	0.8691	0.9752	0.9926	(86)
MIT	20.2034	20.3966	20.6151	20.8237	20.9164	20.9415	20.9444	20.9442	20.9317	20.7914	20.4616	20.1721	(87)
Th 2	20.0526	20.0549	20.0573	20.0688	20.0711	20.0827	20.0827	20.0850	20.0781	20.0711	20.0665	20.0619	(88)
util rest of house	0.9871	0.9633	0.9070	0.7692	0.5794	0.3870	0.2565	0.2893	0.5075	0.8299	0.9668	0.9903	(89)
MIT 2	19.1313	19.3750	19.6421	19.8868	19.9789	20.0102	20.0118	20.0142	19.9995	19.8616	19.4687	19.0992	(90)
Living area fraction										FLA = Living area / (4) =		0.2272	(91)
MIT	19.3749	19.6071	19.8631	20.0996	20.1919	20.2218	20.2237	20.2255	20.2113	20.0728	19.6942	19.3429	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.3749	19.6071	19.8631	20.0996	20.1919	20.2218	20.2237	20.2255	20.2113	20.0728	19.6942	19.3429	(93)

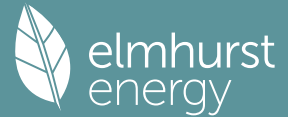
8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9843	0.9587	0.9025	0.7706	0.5869	0.3966	0.2669	0.3003	0.5182	0.8300	0.9626	0.9880	(94)
Useful gains	868.2237	1037.1783	1123.0909	1087.2922	883.9551	589.6275	381.1870	401.1468	638.2814	873.5327	863.9453	822.0100	(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	1643.8804	1599.4650	1449.3868	1198.3246	906.1154	591.6290	381.3528	401.4662	646.7229	1010.7870	1351.2306	1633.5539	(97)
Space heating kWh	577.0886	377.8567	242.7641	79.9434	16.4872	0.0000	0.0000	0.0000	0.0000	102.1172	350.8454	603.7886	(98a)
Space heating requirement - total per year (kWh/year)												2350.8913	
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	577.0886	377.8567	242.7641	79.9434	16.4872	0.0000	0.0000	0.0000	0.0000	102.1172	350.8454	603.7886	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2350.8913	
Space heating per m2										(98c) / (4) =		22.3554	(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 %)													249.9000 (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	577.0886	377.8567	242.7641	79.9434	16.4872	0.0000	0.0000	0.0000	0.0000	102.1172	350.8454	603.7886	(98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000	(210)
Space heating fuel (main heating system)	230.9278	151.2032	97.1445	31.9901	6.5975	0.0000	0.0000	0.0000	0.0000	40.8632	140.3943	241.6121	(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	295.0979	261.2030	277.8069	244.7040	237.5806	214.4602	211.7994	219.9044	222.0068	247.1292	262.2996	291.9084	(64)
Efficiency of water heater (217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	(216)
Fuel for water heating, kWh/month	168.5311	149.1736	158.6561	139.7510	135.6828	122.4787	120.9591	125.5879	126.7886	141.1360	149.7999	166.7095	(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	28.6884	25.9121	28.6884	27.7630	28.6884	27.7630	28.6884	28.6884	27.7630	28.6884	27.7630	28.6884	(231)
Lighting	27.1441	21.7760	19.6069	14.3648	11.0958	9.0654	10.1220	13.1569	17.0896	22.4224	25.3261	27.8985	(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												940.7328	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												175.1000	

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Water heating fuel used	1705.2544	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940) mechanical ventilation fans (SFP = 0.9940)	337.7833	(230a)
Total electricity for the above, kWh/year	337.7833	(231)
Electricity for lighting (calculated in Appendix L)	219.0685	(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	3202.8390	(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	940.7328	0.1576	148.2820	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1705.2544	0.1408	240.1531	(264)
Space and water heating			388.4352	(265)
Pumps, fans and electric keep-hot	337.7833	0.1387	46.8547	(267)
Energy for lighting	219.0685	0.1443	31.6184	(268)
Total CO2, kg/year			466.9082	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.4400	(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	940.7328	1.5835	1489.6295	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1705.2544	1.5207	2593.2479	(278)
Space and water heating			4082.8774	(279)
Pumps, fans and electric keep-hot	337.7833	1.5128	510.9986	(281)
Energy for lighting	219.0685	1.5338	336.0146	(282)
Total Primary energy kWh/year			4929.8906	(286)
Dwelling Primary energy Rate (DPER)			46.8800	(287)

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

1. Overall dwelling characteristics

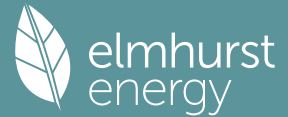
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	54.2200 (1b)	x 2.6100 (2b)	= 141.5142	(1b) - (3b)
First floor	50.9400 (1c)	x 2.6900 (2c)	= 137.0286	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	105.1600			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 278.5428	(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	4 * 10 =	40.0000 (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) =	40.0000 / (5) = 0.1436 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.3936 (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) =	0.3346 (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	0.4266	0.4182	0.4098	0.3680	0.3597	0.3178	0.3178	0.3095	0.3346	0.3597	0.3764	0.3931 (22b)
Effective ac	0.5910	0.5874	0.5840	0.5677	0.5647	0.5505	0.5505	0.5479	0.5560	0.5647	0.5708	0.5773 (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			2.1000	1.0000	2.1000			(26)
TER Opening Type			24.1700	1.1450	27.6756			(27)
FT01			54.2200	0.1300	7.0486			(28a)
WT01 Brick	83.4900	17.4800	66.0100	0.1800	11.8818			(29a)
WT02 Tile hung	78.7900	8.7900	70.0000	0.1800	12.6000			(29a)
RT01	54.2200		54.2200	0.1100	5.9642			(30)
Total net area of external elements Aum(A, m2)			270.7200					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		67.2702			(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	20.2200	0.0500	1.0110	
E3 Sill	16.7300	0.0500	0.8365	
E4 Jamb	43.2000	0.0500	2.1600	
E5 Ground floor (normal)	31.9900	0.1600	5.1184	
E6 Intermediate floor within a dwelling	26.8500	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	18.6900	0.0600	1.1214	
E12 Gable (insulation at ceiling level)	15.7400	0.0600	0.9444	
E16 Corner (normal)	26.4200	0.0900	2.3778	
E17 Corner (inverted - internal area greater than external area)	5.2200	-0.0900	-0.4698	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	0.0000	0.5600	0.0000	
E24 Eaves (insulation at ceiling level - inverted)	2.4400	0.2400	0.5856	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				13.6853 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	80.9555 (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	54.3224	53.9977	53.6794	52.1843	51.9045	50.6024	50.6024	50.3612	51.1040	51.9045	52.4704	53.0620	(38)
Heat transfer coeff	135.2779	134.9531	134.6348	133.1397	132.8600	131.5578	131.5578	131.3167	132.0594	132.8600	133.4259	134.0175	(39)
Average = Sum(39)m / 12 =													133.1384

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2864	1.2833	1.2803	1.2661	1.2634	1.2510	1.2510	1.2487	1.2558	1.2634	1.2688	1.2744	(40)
HLP (average)												1.2661	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

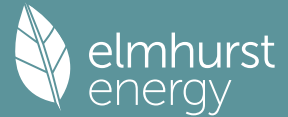
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.7824 (42)
Hot water usage for mixer showers	70.8721	69.8070	68.2550	65.2855	63.0941	60.6502	59.2612	60.8014	62.4898	65.1138	68.1471	70.6005 (42a)	
Hot water usage for baths	30.6005	30.1461	29.5061	28.3261	27.4425	26.4628	25.9336	26.5691	27.2610	28.3094	29.5137	30.4971 (42b)	
Hot water usage for other uses	43.1249	41.5567	39.9886	38.4204	36.8522	35.2840	35.2840	36.8522	38.4204	39.9886	41.5567	43.1249 (42c)	
Average daily hot water use (litres/day)												132.9177 (43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy content (annual)	144.5975	141.5098	137.7497	132.0320	127.3888	122.3970	120.4788	124.2227	128.1712	133.4117	139.2175	144.2225 (44)	
Distribution loss (46)m = 0.15 x (45)m	229.0072	201.5081	211.7161	180.7452	171.4898	150.5014	145.7086	153.8137	158.0480	181.0385	198.3408	225.8177 (45)	
Water storage loss (or HIU loss):										Total = Sum(45)m =		2207.7350	
Store volume	34.3511	30.2262	31.7574	27.1118	25.7235	22.5752	21.8563	23.0720	23.7072	27.1558	29.7511	33.8726 (46)	
a) If manufacturer declared loss factor is known (kWh/day):												200.0000 (47)	
Temperature factor from Table 2b												1.6525 (48)	
Enter (49) or (54) in (55)												0.5400 (49)	
Total storage loss												0.8924 (55)	
If cylinder contains dedicated solar storage	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (56)	
Primary loss	27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637 (57)	
Combi loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)	
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)	
WWHRS	279.9332	247.5059	262.6422	230.0285	222.4159	199.7847	196.6347	204.7397	207.3313	231.9645	247.6241	276.7437 (62)	
PV diverter	-32.3998	-28.6546	-30.0055	-24.8457	-23.1553	-19.8142	-18.5726	-19.7501	-20.5005	-24.1678	-27.3792	-31.7998 (63a)	
Solar input	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000 (63b)	
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)	
Output from w/h	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63d)	
12Total per year (kWh/year)	247.5335	218.8512	232.6367	205.1828	199.2606	179.9706	178.0621	184.9896	186.8308	207.7967	220.2449	244.9440 (64)	
Electric shower(s)								Total per year (kWh/year) = Sum(64)m =				2506.3034 (64)	
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)	
												0.0000 (64a)	
Heat gains from water heating, kWh/month													
	116.8857	103.7996	111.1365	99.5244	97.7612	89.4684	89.1890	91.8839	91.9776	100.9361	105.3750	115.8252 (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	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	139.1217	(66)
Lighting gains	(calculated in Appendix L, equation L9 or L9a), also see Table 5												
	133.3645	147.6535	133.3645	137.8099	133.3645	137.8099	133.3645	133.3645	137.8099	133.3645	137.8099	133.3645	(67)

Full SAP Calculation Printout



Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	264.4099	267.1537	260.2395	245.5201	226.9395	209.4763	197.8099	195.0661	201.9803	216.6997	235.2803	252.7435 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122	36.9122 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974	-111.2974 (71)
Water heating gains (Table 5)	157.1045	154.4638	149.3770	138.2283	131.3995	124.2616	119.8776	123.4999	127.7466	135.6669	146.3541	155.6791 (72)
Total internal gains	622.6154	637.0075	610.7175	589.2949	559.4400	536.2844	515.7885	516.6669	532.2734	553.4675	587.1809	609.5235 (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	
North					2.8800	10.6334	0.6300	0.7000	0.7700		9.3591 (74)	
East					4.7200	19.6403	0.6300	0.7000	0.7700		28.3309 (76)	
South					8.8800	46.7521	0.6300	0.7000	0.7700		126.8778 (78)	
West					7.6900	19.6403	0.6300	0.7000	0.7700		46.1578 (80)	
Solar gains	210.7257	371.3948	535.0572	697.9636	806.4262	809.4876	776.8752	695.8869	592.1419	418.3192	254.8179	178.6923 (83)
Total gains	833.3411	1008.4023	1145.7747	1287.2585	1365.8662	1345.7720	1292.6637	1212.5539	1124.4153	971.7868	841.9988	788.2158 (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	53.9835	54.1134	54.2414	54.8505	54.9660	55.5100	55.5100	55.6119	55.2992	54.9660	54.7328	54.4912
alpha	4.5989	4.6076	4.6161	4.6567	4.6644	4.7007	4.7007	4.7075	4.6866	4.6644	4.6489	4.6327
util living area	0.9935	0.9842	0.9628	0.9017	0.7798	0.5979	0.4421	0.4886	0.7281	0.9335	0.9859	0.9950 (86)
MIT	19.5765	19.8254	20.1546	20.5505	20.8298	20.9626	20.9926	20.9884	20.9075	20.5260	19.9778	19.5375 (87)
Th 2	19.8515	19.8539	19.8563	19.8675	19.8696	19.8794	19.8794	19.8812	19.8756	19.8696	19.8654	19.8609 (88)
util rest of house	0.9914	0.9791	0.9508	0.8709	0.7179	0.5047	0.3325	0.3746	0.6386	0.9054	0.9805	0.9933 (89)
MIT 2	18.2209	18.5376	18.9506	19.4330	19.7353	19.8597	19.8773	19.8775	19.8182	19.4189	18.7417	18.1778 (90)
Living area fraction	18.5288	18.8302	19.2241	19.6869	19.9839	20.1102	20.1306	20.1299	20.0657	19.6704	19.0225	18.4867 (92)
MIT	18.5288	18.8302	19.2241	19.6869	19.9839	20.1102	20.1306	20.1299	20.0657	19.6704	19.0225	18.4867 (93)
Temperature adjustment												0.0000
adjusted MIT	18.5288	18.8302	19.2241	19.6869	19.9839	20.1102	20.1306	20.1299	20.0657	19.6704	19.0225	18.4867 (93)

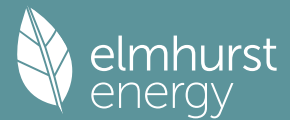
8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	823.1919	981.0613	1079.5986	1113.5901	989.9742	706.1104	462.0556	485.6761	736.5228	873.8934	820.8298	780.5683 (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	1924.8464	1879.9216	1713.1106	1436.1608	1100.6043	724.9153	464.4843	489.7923	787.8270	1205.0945	1590.7715	1914.6662 (97)
Space heating kWh	819.6310	604.0341	471.3330	232.2509	82.3088	0.0000	0.0000	0.0000	0.0000	246.4136	554.3580	843.7689 (98a)
Space heating requirement - total per year (kWh/year)												3854.0981
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	819.6310	604.0341	471.3330	232.2509	82.3088	0.0000	0.0000	0.0000	0.0000	246.4136	554.3580	843.7689 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3854.0981
Space heating per m2										(98c) / (4) =		36.6498 (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	819.6310	604.0341	471.3330	232.2509	82.3088	0.0000	0.0000	0.0000	0.0000	246.4136	554.3580	843.7689 (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)	888.0075	654.4248	510.6533	251.6261	89.1753	0.0000	0.0000	0.0000	0.0000	266.9703	600.6045	914.1591 (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	247.5335	218.8512	232.6367	205.1828	199.2606	179.9706	178.0621	184.9896	186.8308	207.7967	220.2449	244.9440 (64)
Efficiency of water heater (217)m	86.5362	86.2140	85.6093	84.3384	82.2364	79.8000	79.8000	79.8000	79.8000	84.4430	86.0409	79.8000 (216)
Fuel for water heating, kWh/month	286.0462	253.8465	271.7423	243.2852	242.3021	225.5270	223.1354	231.8166	234.1238	246.0792	255.9771	282.8370 (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)

Full SAP Calculation Printout



Lighting	27.7105	22.2304	20.0160	14.6646	11.3273	9.2545	10.3332	13.4315	17.4461	22.8903	25.8545	28.4807	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-48.9559	-68.1336	-96.6876	-107.2630	-114.4238	-106.3109	-104.9264	-99.6075	-90.1117	-77.1476	-53.4769	-42.4240	(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	-30.4328	-63.6777	-125.9609	-188.3461	-248.2725	-249.2277	-246.3590	-209.0009	-153.6932	-90.8626	-40.5599	-24.0974	(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												4175.6209	(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												2996.7183	(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)												223.6396	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-2679.9593	(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												4802.0195	(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	4175.6209	0.2100	876.8804 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2996.7183	0.2100	629.3108 (264)
Space and water heating			1506.1912 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	223.6396	0.1443	32.2781 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1009.4687	0.1349	-136.1529
PV Unit electricity exported	-1670.4906	0.1260	-210.5182
Total			-346.6711 (269)
Total CO2, kg/year			1203.7275 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.4500 (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	4175.6209	1.1300	4718.4516 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2996.7183	1.1300	3386.2917 (278)
Space and water heating			8104.7433 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	223.6396	1.5338	343.0259 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-1009.4687	1.4985	-1512.6832
PV Unit electricity exported	-1670.4906	0.4626	-772.7554
Total			-2285.4387 (283)
Total Primary energy kWh/year			6292.4314 (286)
Target Primary Energy Rate (TPER)			59.8400 (287)

Summary for Input Data



Plot Reference	AT13	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	82 B	DER	3.44	TER	9.58
Environmental	96 A	% DER < TER			64.09
CO ₂ Emissions (t/year)	0.66	DFEE	41.94	TFEE	43.53
Compliance Check	See BREL	% DFEE < TFEE			3.66
% DPER < TPER	28.53	DPER	35.99	TPER	50.35

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North
Property Tenture	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	3
3.0 Date Built	2026
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Enter TMP value
Thermal Mass	250.00
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	44.35 m	86.94 m²	2.61 m
	2nd Storey:	44.35 m	86.94 m²	2.69 m
		6.98 m	39.29 m²	2.38 m

8.0 Living Area	18.90	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	WT01 Brick	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		115.75	82.04	0.00	None	33.71	Enter Gross Area
	WT03 Dormer	Timber Frame	Timber framed wall (one layer of plasterboard)	0.18		3.70	2.22	0.00	None	1.48	Enter Gross Area
	WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		135.94	133.62	0.00	None	2.32	Enter Gross Area

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation	Openings Type
	RT01 Ceiling	External Plane	Plasterboard, insulated at ceiling level	0.11	9.00	1.08	1.08	None	0.00	Enter Gross Area	0.00
	RT02 Rafter	External Slope	Plasterboard, insulated slope	0.11	9.00	130.23	128.87	None	0.00	Enter Gross Area	2.72

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	86.94

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00
	Roof light	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT01 Brick	East	2.10	
D002	DG Win	WT01 Brick	West	5.22	
W001	DG Win	WT01 Brick	East	2.72	
W002	DG Win	WT01 Brick	East	2.72	
W003	DG Win	WT01 Brick	South	1.50	
W004	DG Win	WT01 Brick	South	0.84	
W005	DG Win	WT01 Brick	North	1.50	
D003	DG Win	WT01 Brick	West	2.38	
W006	DG Win	WT01 Brick	North	2.17	
W008	DG Win	WT01 Brick	East	2.17	
W009	DG Win	WT01 Brick	East	1.50	
W007	DG Win	WT01 Brick	North	1.50	
W010	DG Win	WT01 Brick	East	2.17	
RL01	Roof light	RT02 Rafter	West	0.68	0
RL02	Roof light	RT02 Rafter	West	0.68	0
D004	DG Win	WT01 Brick	West	5.22	
W011	DG Win	WT02 Tile hung	North	0.82	
W012	DG Win	WT02 Tile hung	North	1.50	
W013	DG Win	WT03 Dormer	North	1.48	
RL03	Roof light	RT02 Rafter	West	0.68	0
RL04	Roof light	RT02 Rafter	West	0.68	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	Calculate Bridges
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17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted	Reference:	Imported
E1 Steel lintel with perforated steel base plate	Non Gov Approved Schemes	0.00	0.05	0.05	Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	25.01	0.05	0.05	Table R2	No
E3 Sill	Non Gov Approved Schemes	17.90	0.05	0.05	Table R2	No
E4 Jamb	Non Gov Approved Schemes	49.20	0.05	0.05	Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	44.35	0.16	0.16	Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	51.33	0.00	0.00	Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	20.83	0.04	0.04	Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	23.52	0.08	0.08	Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	37.10	0.09	0.09	Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	15.90	-0.09	-0.09	Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	0.00	0.06	0.06	Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	0.00	0.08	0.08	Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00	Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	0.00	0.00	0.00	Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	0.00	0.12	0.12	Table R2	No
E15 Flat roof with parapet	Independently assessed	0.00	0.56	0.56	Table R2	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	8.74	0.24	0.24	Table R2	No
E20 Exposed floor (normal)	Non Gov Approved Schemes	0.00	0.32	0.32	Table R2	No
R1 Head of roof window	Non Gov Approved Schemes	3.00	0.08	0.08	Table R2	No
R2 Sill of roof window	Non Gov Approved Schemes	3.00	0.06	0.06	Table R2	No
R3 Jamb of roof window	Non Gov Approved Schemes	7.20	0.08	0.08	Table R2	No
R4 Ridge (vaulted ceiling)	Non Gov Approved Schemes	10.31	0.08	0.08	Table R2	No
R7 Flat ceiling (inverted)	Non Gov Approved Schemes	1.48	0.04	0.04	Table R2	No
R9 Roof to wall (flat ceiling)	Non Gov Approved Schemes	2.94	0.04	0.04	Table R2	No

Y-value	0.04	W/m ² K
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19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)

Summary for Input Data

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				
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 Fixed Lighting	No				
	Name LEL	Efficacy 85.00	Power 10.00	Capacity 850.00	Count 20
24.0 Main Heating 1					
	SAP table				
Percentage of Heat	100.00 %				
Fuel Type	Electricity				
SAP Code	214				
In Winter	249.90				
In Summer	175.10				
Controls SAP Code	2207				
Controls description	Time and temperature zone control by arrangement				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators and Underfloor				
Underfloor Heating	Yes - Pipes in thin screed				
Flow Temperature	Enter value				
Flow Temperature Value	35.00				
25.0 Main Heating 2					
	None				
26.0 Heat Networks					
	None				
27.0 Secondary Heating					
	None				
28.0 Water Heating					
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 mains				

Summary for Input Data

Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

None

34.0 Small-scale Hydro

None												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT13			Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	82 B	DER	3.44	TER	9.58
Environmental	96 A	% DER < TER			64.09
CO ₂ Emissions (t/year)	0.66	DFEE	41.94	TFEE	43.53
Compliance Check	See BREL	% DFEE < TFEE			3.66
% DPER < TPER	28.53	DPER	35.99	TPER	50.35
Assessor Details	Mr. Giles Murgatroyd			Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC				

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	86.9400 (1b)	x 2.6100 (2b)	= 226.9134 (1b) - (3b)
First floor	86.9400 (1c)	x 2.6900 (2c)	= 233.8686 (1c) - (3c)
Second floor	39.2900 (1d)	x 2.3800 (2d)	= 93.5102 (1d) - (3d)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	213.1700		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 554.2922 (5)

2. Ventilation rate

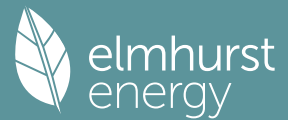
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			35.4100	1.1450	40.5458		(27)
Solid door			2.1000	1.0000	2.1000		(26)
Roof light			2.7200	1.1450	3.1145		(27a)
FT01			86.9400	0.1300	11.3022		(28a)
WT01 Brick	115.7500	33.7100	82.0400	0.1800	14.7672		(29a)
WT03 Dormer	3.7000	1.4800	2.2200	0.1800	0.3996		(29a)
WT02 Tile hung	135.9400	2.3200	133.6200	0.1800	24.0516		(29a)
RT01 Ceiling	1.0800		1.0800	0.1100	0.1188		(30)
RT02 Rafter	130.2300	2.7200	127.5100	0.1100	14.0261		(30)
Total net area of external elements Aum(A, m ²)			473.6400				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	110.4258		(33)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)

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List of Thermal Bridges

	Length	Psi-value	Total
K1 Element			
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000
E2 Other lintels (including other steel lintels)	25.0100	0.0500	1.2505
E3 Sill	17.9000	0.0500	0.8950
E4 Jamb	49.2000	0.0500	2.4600
E5 Ground floor (normal)	44.3500	0.1600	7.0960
E6 Intermediate floor within a dwelling	51.3300	0.0000	0.0000
E11 Eaves (insulation at rafter level)	20.8300	0.0400	0.8332
E13 Gable (insulation at rafter level)	23.5200	0.0800	1.8816
E16 Corner (normal)	37.1000	0.0900	3.3390
E17 Corner (inverted - internal area greater than external area)	15.9000	-0.0900	-1.4310
E18 Party wall between dwellings	0.0000	0.0600	0.0000
P1 Party wall - Ground floor	0.0000	0.0800	0.0000
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000
E15 Flat roof with parapet	0.0000	0.5600	0.0000
E24 Eaves (insulation at ceiling level - inverted)	8.7400	0.2400	2.0976
E20 Exposed floor (normal)	0.0000	0.3200	0.0000
R1 Head of roof window	3.0000	0.0800	0.2400
R2 Sill of roof window	3.0000	0.0600	0.1800
R3 Jamb of roof window	7.2000	0.0800	0.5760
R4 Ridge (vaulted ceiling)	10.3100	0.0800	0.8248
R7 Flat ceiling (inverted)	1.4800	0.0400	0.0592
R9 Roof to wall (flat ceiling)	2.9400	0.0400	0.1176
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			20.4195 (36)
Point Thermal Bridges			0.0000 (36a)
Total fabric heat loss		(33) + (36) + (36a) =	130.8453 (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	48.7587	48.1756	47.5926	44.6773	44.0943	41.1791	41.1791	40.5960	42.3452	44.0943	45.2604	46.4265 (38)
Average = Sum(39)m / 12 =	179.6040	179.0209	178.4379	175.5226	174.9396	172.0244	172.0244	171.4413	173.1905	174.9396	176.1057	177.2718 (39)
												175.3769
HLP	0.8425	0.8398	0.8371	0.8234	0.8207	0.8070	0.8070	0.8042	0.8125	0.8207	0.8261	0.8316 (40)
HLP (average)												0.8227
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

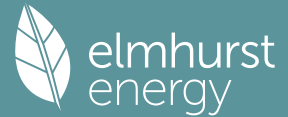
4. Water heating energy requirements (kWh/year)

Assumed occupancy													3.0190 (42)
Hot water usage for mixer showers	74.8394	73.7147	72.0758	68.9401	66.6260	64.0453	62.5785	64.2050	65.9879	68.7588	71.9618	74.5527 (42a)	
Hot water usage for baths	32.3066	31.8268	31.1512	29.9054	28.9725	27.9382	27.3795	28.0504	28.7809	29.8877	31.1592	32.1974 (42b)	
Hot water usage for other uses	45.5481	43.8918	42.2355	40.5792	38.9229	37.2666	37.2666	38.9229	40.5792	42.2355	43.8918	45.5481 (42c)	
Average daily hot water use (litres/day)												140.3601 (43)	
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy content (annual)	152.6941	149.4333	145.4625	139.4247	134.5214	129.2501	127.2246	131.1783	135.3480	140.8820	147.0128	152.2981 (44)	
Distribution loss (46)m = 0.15 x (45)m	241.8301	212.7910	223.5704	190.8654	181.0917	158.9281	153.8671	162.4261	166.8977	191.1755	209.4467	238.4621 (45)	
Water storage loss (or HIU loss):										Total = Sum(45)m =		2331.3519	
Store volume	36.2745	31.9187	33.5356	28.6298	27.1638	23.8392	23.0801	24.3639	25.0347	28.6763	31.4170	35.7693 (46)	
a) If manufacturer declared loss factor is known (kWh/day):												200.0000 (47)	
Temperature factor from Table 2b												1.7200 (48)	
Enter (49) or (54) in (55)												0.5400 (49)	
Total storage loss												0.9288 (55)	
If cylinder contains dedicated solar storage	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)	
Primary loss	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)	
Combi loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (59)	
Total heat required for water heating calculated for each month	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)	
WWHRS	307.9209	272.4859	289.6612	254.8242	247.1825	222.8869	219.9579	228.5169	230.8565	257.2663	273.4055	304.5528 (62)	
PV diverter	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63a)	
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63b)	
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63c)	
Output from w/h	307.9209	272.4859	289.6612	254.8242	247.1825	222.8869	219.9579	228.5169	230.8565	257.2663	273.4055	304.5528 (64)	
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		3109.5173 (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	133.2811	118.5089	127.2098	114.6298	113.0856	104.0106	104.0334	106.8793	106.6605	116.4385	120.8081	132.1612 (65)	

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

Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525 (66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	197.2531	218.3873	197.2531	203.8282	197.2531	203.8282	197.2531	197.2531	203.8282	197.2531	203.8282	197.2531 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	383.3962	387.3746	377.3490	356.0058	329.0638	303.7421	286.8256	282.8471	292.8727	314.2160	341.1580	366.4797 (68)
Pumps, fans	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952 (69)
Losses e.g. evaporation (negative values) (Table 5)	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)
Water heating gains (Table 5)	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620 (71)
Total internal gains	179.1413	176.3526	170.9809	159.2080	151.9968	144.4592	139.8299	143.6550	148.1396	156.5033	167.7890	177.6361 (72)
	831.0763	853.4003	816.8687	790.3277	749.5994	720.3152	692.1943	692.0409	713.1263	739.2581	784.0609	812.6546 (73)

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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
North													8.9700	10.6334	0.6300	0.7000	0.7700	29.1498 (74)
East													11.2800	19.6403	0.6300	0.7000	0.7700	67.7062 (76)
South													2.3400	46.7521	0.6300	0.7000	0.7700	33.4340 (78)
West													12.8200	19.6403	0.6300	0.7000	0.7700	76.9497 (80)
West													2.7200	26.0000	0.6300	0.7000	1.0000	28.0688 (82)
Solar gains	235.3085	451.7374	734.0717	1072.4831	1327.2059	1366.9194	1297.7834	1104.2342	852.8287	532.3998	291.5854	194.8197	(83)					
Total gains	1066.3848	1305.1377	1550.9405	1862.8109	2076.8052	2087.2346	1989.9777	1796.2752	1565.9549	1271.6579	1075.6463	1007.4743	(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	82.4229	82.6913	82.9615	84.3394	84.6205	86.0545	86.0545	86.3472	85.4751	84.6205	84.0602	83.5072
alpha	6.4949	6.5128	6.5308	6.6226	6.6414	6.7370	6.7370	6.7565	6.6983	6.6414	6.6040	6.5671
util living area	0.9992	0.9968	0.9855	0.9184	0.7437	0.5241	0.3800	0.4381	0.7293	0.9702	0.9975	0.9995 (86)
MIT	20.1795	20.3202	20.5289	20.7875	20.9201	20.9510	20.9536	20.9533	20.9323	20.7182	20.4019	20.1635 (87)
Th 2	20.2166	20.2190	20.2213	20.2331	20.2355	20.2473	20.2473	20.2497	20.2426	20.2355	20.2307	20.2260 (88)
util rest of house	0.9990	0.9958	0.9808	0.8955	0.6944	0.4640	0.3152	0.3672	0.6621	0.9572	0.9966	0.9993 (89)
MIT 2	19.2358	19.4177	19.6844	20.0077	20.1492	20.1865	20.1880	20.1904	20.1691	19.9343	19.5324	19.2230 (90)
Living area fraction	fLA = Living area / (4) =											
MIT	19.3195	19.4977	19.7593	20.0768	20.2175	20.2543	20.2559	20.2580	20.2368	20.0038	19.6095	19.3064 (92)
Temperature adjustment												
adjusted MIT	19.3195	19.4977	19.7593	20.0768	20.2175	20.2543	20.2559	20.2580	20.2368	20.0038	19.6095	19.3064 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9985	0.9945	0.9772	0.8902	0.6932	0.4646	0.3159	0.3679	0.6616	0.9523	0.9955	0.9990 (94)
Useful gains	1064.8286	1297.9980	1515.5917	1658.2373	1439.6546	969.6408	628.7156	660.9342	1036.0096	1210.9625	1070.7883	1006.4502 (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	2697.5585	2613.3003	2365.9575	1961.7874	1490.0508	972.6795	628.8990	661.4236	1062.8312	1645.0986	2202.9950	2677.9332 (97)
Space heating kWh	1214.7511	883.8831	632.6722	218.5561	37.4948	0.0000	0.0000	0.0000	0.0000	322.9972	815.1888	1243.5834 (98a)
Space heating requirement - total per year (kWh/year)												
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)												
Space heating kWh	1214.7511	883.8831	632.6722	218.5561	37.4948	0.0000	0.0000	0.0000	0.0000	322.9972	815.1888	1243.5834 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												
Space heating per m ²	(98c) / (4) =											

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 %)												249.9000 (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	1214.7511	883.8831	632.6722	218.5561	37.4948	0.0000	0.0000	0.0000	0.0000	322.9972	815.1888	1243.5834 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)	486.0949	353.6947	253.1701	87.4574	15.0039	0.0000	0.0000	0.0000	0.0000	129.2506	326.2060	497.6324 (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	307.9209	272.4859	289.6612	254.8242	247.1825	222.8869	219.9579	228.5169	230.8565	257.2663	273.4055	304.5528 (64)
Efficiency of water heater	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)
Fuel for water heating, kWh/month	175.8543	155.6173	165.4261	145.5307	141.1665	127.2912	125.6184	130.5065	131.8426	146.9253	156.1425	173.9308 (219)
Space cooling fuel requirement	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	57.0892	51.5644	57.0892	55.2476	57.0892	55.2476	57.0892	57.0892	55.2476	57.0892	55.2476	57.0892 (231)
Lighting	45.0509	36.1415	32.5414	23.8412	18.4157	15.0457	16.7994	21.8365	28.3634	37.2143	42.0335	46.3030 (232)
Electricity generated by PVs (Appendix M) (negative quantity)	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)	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)	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)	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)												

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(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												2148.5101	(211)
Space heating fuel - main system 2												0.0000	(213)
Space heating fuel - secondary												0.0000	(215)
Efficiency of water heater												175.1000	
Water heating fuel used												1775.8523	(219)
Space cooling fuel												0.0000	(221)

Electricity for pumps and fans:													
(BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940)													
mechanical ventilation fans (SFP = 0.9940)												672.1791	(230a)
Total electricity for the above, kWh/year												672.1791	(231)
Electricity for lighting (calculated in Appendix L)												363.5865	(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												4960.1279	(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	2148.5101	0.1569	336.9958	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	1775.8523	0.1409	250.1483	(264)
Space and water heating			587.1441	(265)
Pumps, fans and electric keep-hot	672.1791	0.1387	93.2395	(267)
Energy for lighting	363.5865	0.1443	52.4768	(268)
Total CO2, kg/year			732.8604	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			3.4400	(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	2148.5101	1.5807	3396.0753	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	1775.8523	1.5209	2700.8066	(278)
Space and water heating			6096.8819	(279)
Pumps, fans and electric keep-hot	672.1791	1.5128	1016.8725	(281)
Energy for lighting	363.5865	1.5338	557.6811	(282)
Total Primary energy kWh/year			7671.4355	(286)
Dwelling Primary energy Rate (DPER)			35.9900	(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				
Ground floor	86.9400 (1b)	x 2.6100 (2b)	= 226.9134 (1b) - (3b)	
First floor	86.9400 (1c)	x 2.6900 (2c)	= 233.8686 (1c) - (3c)	
Second floor	39.2900 (1d)	x 2.3800 (2d)	= 93.5102 (1d) - (3d)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)... (1n)	213.1700			(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e) ... (3n) =	554.2922	(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	4 * 10 =	40.0000 (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)+(7a)+(7b)+(7c) =	40.0000 / (5) =	0.0722 (8)
Pressure test	Yes	
Pressure Test Method	Blower Door	
Measured/design AP50	5.0000	(17)
Infiltration rate	0.3222	(18)

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Number of sides sheltered

2 (19)

Shelter factor

$$(20) = 1 - [0.075 \times (19)] = 0.8500 \quad (20)$$

Infiltration rate adjusted to include shelter factor

$$(21) = (18) \times (20) = 0.2738 \quad (21)$$

	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													
	0.3491	0.3423	0.3355	0.3012	0.2944	0.2601	0.2601	0.2533	0.2738	0.2944	0.3081	0.3218	(22b)
Effective ac	0.5610	0.5586	0.5563	0.5454	0.5433	0.5338	0.5338	0.5321	0.5375	0.5433	0.5475	0.5518	(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			2.1000	1.0000	2.1000			(26)
TER Opening Type			35.4100	1.1450	40.5458			(27)
TER Roof Window			2.7200	1.1450	4.3296			(27a)
FT01			86.9400	0.1300	11.3022			(28a)
WT01 Brick	115.7500	33.7100	82.0400	0.1800	14.7672			(29a)
WT03 Dormer	3.7000	1.4800	2.2200	0.1800	0.3996			(29a)
WT02 Tile hung	135.9400	2.3200	133.6200	0.1800	24.0516			(29a)
RT01 Ceiling	1.0800		1.0800	0.1100	0.1188			(30)
RT02 Rafter	130.2300	2.7200	127.5100	0.1100	14.0261			(30)
Total net area of external elements Aum(A, m2)			473.6400					(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) =	111.6409		(33)

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

250.0000 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	25.0100	0.0500	1.2505	
E3 Sill	17.9000	0.0500	0.8950	
E4 Jamb	49.2000	0.0500	2.4600	
E5 Ground floor (normal)	44.3500	0.1600	7.0960	
E6 Intermediate floor within a dwelling	51.3300	0.0000	0.0000	
E11 Eaves (insulation at rafter level)	20.8300	0.0400	0.8332	
E13 Gable (insulation at rafter level)	23.5200	0.0800	1.8816	
E16 Corner (normal)	37.1000	0.0900	3.3390	
E17 Corner (inverted - internal area greater than external area)	15.9000	-0.0900	-1.4310	
E18 Party wall between dwellings	0.0000	0.0600	0.0000	
P1 Party wall - Ground floor	0.0000	0.0800	0.0000	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	0.0000	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	0.0000	0.1200	0.0000	
E15 Flat roof with parapet	0.0000	0.5600	0.0000	
E24 Eaves (insulation at ceiling level - inverted)	8.7400	0.2400	2.0976	
E20 Exposed floor (normal)	0.0000	0.3200	0.0000	
R1 Head of roof window	3.0000	0.0800	0.2400	
R2 Sill of roof window	3.0000	0.0600	0.1800	
R3 Jamb of roof window	7.2000	0.0800	0.5760	
R4 Ridge (vaulted ceiling)	10.3100	0.0800	0.8248	
R7 Flat ceiling (inverted)	1.4800	0.0400	0.0592	
R9 Roof to wall (flat ceiling)	2.9400	0.0400	0.1176	

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

20.4195 (36)

Point Thermal bridges

(36a) = 0.0000

Total fabric heat loss

$$(33) + (36) + (36a) = 132.0604 \quad (37)$$

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	102.6072	102.1743	101.7499	99.7567	99.3838	97.6478	97.6478	97.3263	98.3165	99.3838	100.1382	100.9269	(38)
Heat transfer coeff	234.6676	234.2347	233.8103	231.8171	231.4442	229.7082	229.7082	229.3867	230.3769	231.4442	232.1986	232.9873	(39)
Average = Sum(39)m / 12 =													231.8153

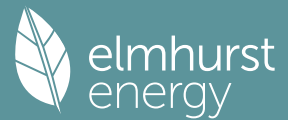
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1008	1.0988	1.0968	1.0875	1.0857	1.0776	1.0776	1.0761	1.0807	1.0857	1.0893	1.0930	(40)
HLP (average)													1.0875
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

Assumed occupancy													3.0190 (42)
Hot water usage for mixer showers													
74.8394	73.7147	72.0758	68.9401	66.6260	64.0453	62.5785	64.2050	65.9879	68.7588	71.9618	74.5527	74.5527	(42a)
Hot water usage for baths													
32.3066	31.8268	31.1512	29.9054	28.9725	27.9382	27.3795	28.0504	28.7809	29.8877	31.1592	32.1974	32.1974	(42b)
Hot water usage for other uses													
45.5481	43.8918	42.2355	40.5792	38.9229	37.2666	37.2666	38.9229	40.5792	42.2355	43.8918	45.5481	45.5481	(42c)
Average daily hot water use (litres/day)													140.3601 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	152.6941	149.4333	145.4625	139.4247	134.5214	129.2501	127.2246	131.1783	135.3480	140.8820	147.0128	152.2981	(44)
Energy conte	241.8301	212.7910	223.5704	190.8654	181.0917	158.9281	153.8671	162.4261	166.8977	191.1755	209.4467	238.4621	(45)
Energy content (annual)										Total = Sum(45)m =			2331.3519
Distribution loss (46)m = 0.15 x (45)m													
36.2745	31.9187	33.5356	28.6298	27.1638	23.8392	23.0801	24.3639	25.0347	28.6763	31.4170	35.7693	35.7693	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6525 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8924 (55)
Total storage loss													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	(56)
If cylinder contains dedicated solar storage													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	(57)
Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	22.5120	23.2624	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													
292.7562	258.7888	274.4965	240.1487	232.0178	208.2114	204.7932	213.3522	216.1810	242.1016	258.7300	289.3881	289.3881	(62)
WWHRS	-34.2134	-30.2587	-31.6851	-26.2365	-24.4515	-20.9233	-19.6123	-20.8557	-21.6481	-25.5207	-28.9119	-33.5799	(63a)

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PV diverter	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	(63b)	
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63c)	
FGHRS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63d)	
Output from w/h	258.5427	228.5301	242.8113	213.9121	207.5663	187.2881	185.1809	192.4965	194.5329	216.5809	229.8181	255.8083	(64)	
Total per year (kWh/year) = Sum(64)m =												2613.0683	(64)	
12Total per year (kWh/year)													2613	(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	121.1494	107.5512	115.0780	102.8894	100.9539	92.2702	91.9017	94.7475	94.9201	104.3067	109.0677	120.0295	(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	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	150.9525	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	197.2531	218.3873	197.2531	203.8282	197.2531	203.8282	197.2531	197.2531	203.8282	197.2531	203.8282	197.2531	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	383.3962	387.3746	377.3490	356.0058	329.0638	303.7421	286.8256	282.8471	292.8727	314.2160	341.1580	366.4797	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	38.0952	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	-120.7620	(71)
Water heating gains (Table 5)	162.8352	160.0465	154.6747	142.9019	135.6907	128.1531	123.5237	127.3488	131.8335	140.1972	151.4829	161.3300	(72)
Total internal gains	814.7702	837.0942	800.5626	774.0216	733.2932	704.0091	675.8882	675.7348	696.8201	722.9520	767.7548	796.3485	(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		
North					8.9700	10.6334		0.6300	0.7000	0.7700	29.1498 (74)		
East					11.2800	19.6403		0.6300	0.7000	0.7700	67.7062 (76)		
South					2.3400	46.7521		0.6300	0.7000	0.7700	33.4340 (78)		
West					12.8200	19.6403		0.6300	0.7000	0.7700	76.9497 (80)		
West					2.7200	26.0000		0.6300	0.7000	1.0000	28.0688 (82)		
Solar gains	235.3085	451.7374	734.0717	1072.4831	1327.2059	1366.9194	1297.7834	1104.2342	852.8287	532.3998	291.5854	194.8197	(83)
Total gains	1050.0787	1288.8316	1534.6343	1846.5047	2060.4991	2070.9285	1973.6716	1779.9690	1549.6488	1255.3518	1059.3402	991.1682	(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	63.0827	63.1993	63.3140	63.8584	63.9613	64.4447	64.4447	64.5350	64.2576	63.9613	63.7535	63.5377	
alpha	5.2055	5.2133	5.2209	5.2572	5.2641	5.2963	5.2963	5.3023	5.2838	5.2641	5.2502	5.2358	
util living area	0.9992	0.9976	0.9912	0.9591	0.8581	0.6720	0.5048	0.5771	0.8514	0.9842	0.9981	0.9994	(86)
MIT	19.5439	19.7384	20.0509	20.4740	20.8045	20.9600	20.9926	20.9858	20.8623	20.4039	19.8964	19.5144	(87)
Th 2	20.0001	20.0018	20.0034	20.0111	20.0125	20.0192	20.0192	20.0204	20.0166	20.0125	20.0096	20.0066	(88)
util rest of house	0.9990	0.9967	0.9880	0.9438	0.8102	0.5842	0.3961	0.4622	0.7824	0.9760	0.9972	0.9992	(89)
MIT 2	18.2843	18.5345	18.9341	19.4674	19.8464	19.9963	20.0168	20.0153	19.9182	19.3901	18.7430	18.2511	(90)
Living area fraction	fLA = Living area / (4) =											0.0887	(91)
MIT	18.3959	18.6412	19.0331	19.5566	19.9313	20.0818	20.1033	20.1013	20.0019	19.4800	18.8453	18.3631	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.3959	18.6412	19.0331	19.5566	19.9313	20.0818	20.1033	20.1013	20.0019	19.4800	18.8453	18.3631	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Useful gains	0.9983	0.9949	0.9834	0.9348	0.8057	0.5902	0.4056	0.4720	0.7812	0.9696	0.9957	0.9987	(94)
Ext temp.	1048.2520	1282.2650	1509.2208	1726.0688	1660.0852	1222.1976	800.6147	840.1879	1210.6291	1217.1405	1054.8065	989.8907	(95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Space heating kWh	3307.8609	3218.6632	2930.3784	2470.3829	1905.0870	1259.2097	804.7468	849.0374	1359.6685	2055.2168	2727.2355	3299.8142	(97)
Space heating requirement - total per year (kWh/year)	1681.1491	1301.2596	1057.3412	535.9061	182.2813	0.0000	0.0000	0.0000	0.0000	623.5287	1204.1489	1718.5831	(98a)
Solar heating kWh												8304.1981	
Solar heating contribution - total per year (kWh/year)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(98b)
Space heating kWh	1681.1491	1301.2596	1057.3412	535.9061	182.2813	0.0000	0.0000	0.0000	0.0000	623.5287	1204.1489	1718.5831	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												8304.1981	
Space heating per m2												38.9558	(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)

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	1681.1491	1301.2596	1057.3412	535.9061	182.2813	0.0000	0.0000	0.0000	0.0000	623.5287	1204.1489	1718.5831	(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)	1821.3966	1409.8154	1145.5484	580.6134	197.4879	0.0000	0.0000	0.0000	0.0000	675.5458	1304.6033	1861.9535	(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 requirement	258.5427	228.5301	242.8113	213.9121	207.5663	187.2881	185.1809	192.4965	194.5329	216.5809	229.8181	255.8083	(64)
Efficiency of water heater (217)m	87.4849	87.3287	86.9682	86.0319	83.7698	79.8000	79.8000	79.8000	79.8000	86.2911	87.2234	79.8000	(216)
Fuel for water heating, kWh/month	295.5286	261.6897	279.1955	248.6428	247.7819	234.6968	232.0562	241.2237	243.7755	250.9888	263.4821	292.2818	(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	40.9853	32.8799	29.6047	21.6897	16.7537	13.6880	15.2833	19.8658	25.8038	33.8559	38.2402	42.1244	(232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-76.1152	-104.7391	-146.9191	-160.9521	-169.8884	-157.0522	-154.8638	-147.8205	-135.0993	-117.4886	-82.6583	-66.0898	(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	-51.1821	-106.6159	-210.0904	-313.0474	-411.6833	-413.0423	-408.4107	-347.0229	-255.8338	-151.9103	-68.1266	-40.5752	(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												8996.9643	(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												3091.3434	(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)												330.7748	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-4297.2273	(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												8207.8552	(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	8996.9643	0.2100	1889.3625	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	3091.3434	0.2100	649.1821	(264)
Space and water heating			2538.5446	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	330.7748	0.1443	47.7410	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1519.6864	0.1352	-205.3917	
PV Unit electricity exported	-2777.5410	0.1261	-350.2994	
Total			-555.6911	(269)
Total CO2, kg/year			2042.5238	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			9.5800	(273)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kWh/year	Primary energy kWh/year	
Space heating - main system 1	8996.9643	1.1300	10166.5697	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	3091.3434	1.1300	3493.2181	(278)
Space and water heating			13659.7878	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	330.7748	1.5338	507.3534	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-1519.6864	1.4995	-2278.8277	
PV Unit electricity exported	-2777.5410	0.4630	-1285.8645	
Total			-3564.6923	(283)
Total Primary energy kWh/year			10732.5497	(286)
Target Primary Energy Rate (TPER)			50.3500	(287)

Summary for Input Data



Plot Reference	AT14	Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	81 B	DER	4.66	TER	11.65
Environmental	96 A	% DER < TER			60.00
CO ₂ Emissions (t/year)	0.34	DFEE	36.09	TFEE	37.41
Compliance Check	See BREL	% DFEE < TFEE			3.53
% DPER < TPER	18.46	DPER	49.55	TPER	60.77

Assessor Details	Mr. Giles Murgatroyd	Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC		

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

Orientation	North	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Semi-Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K

7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	No

7.0 Measurements	Ground floor:	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	1st Storey:	22.33 m	39.49 m ²	2.41 m
		22.33 m	39.49 m ²	2.66 m

8.0 Living Area	13.92	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
	WT02 Tile hung	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18		113.21	88.78	0.00	None	24.43	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	Solid Wall	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00		22.36	0.00	None

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
	RT01	External Plane Roof	Plasterboard, insulated at ceiling level	0.11	9.00	39.49	39.49	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m ² K)	Shelter Code	Shelter Factor	Kappa (kJ/m ² K)	Area (m ²)
	FT01	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.13	None	0.00	75.00	39.49

12.0 Opening Types	Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m ² K)
	DG Win	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
	Solid door	Manufacturer	Solid Door				0.63			1.00

13.0 Openings

Summary for Input Data

Name	Opening Type	Location	Orientation	Area (m ²)	Pitch
D001	Solid door	WT02 Tile hung	North	2.10	
D002	DG Win	WT02 Tile hung	South	5.22	
D003	DG Win	WT02 Tile hung	South	5.22	
W001	DG Win	WT02 Tile hung	North	1.50	
W002	DG Win	WT02 Tile hung	North	1.50	
W003	DG Win	WT02 Tile hung	North	1.50	
W004	DG Win	WT02 Tile hung	North West	0.82	
W005	DG Win	WT02 Tile hung	North	1.50	
W006	DG Win	WT02 Tile hung	South	2.12	
W007	DG Win	WT02 Tile hung	South	0.78	
W008	DG Win	WT02 Tile hung	South	2.17	

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	Non Gov Approved Schemes	0.00	0.05	0.05 Table R2	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	15.92	0.05	0.05 Table R2	No
E3 Sill	Non Gov Approved Schemes	9.95	0.05	0.05 Table R2	No
E4 Jamb	Non Gov Approved Schemes	31.80	0.05	0.05 Table R2	No
E5 Ground floor (normal)	Non Gov Approved Schemes	22.33	0.16	0.16 Table R2	No
E6 Intermediate floor within a dwelling	Non Gov Approved Schemes	22.33	0.00	0.00 Table R2	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	17.92	0.06	0.06 Table R2	No
E11 Eaves (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.24	0.24 Table R2	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	4.41	0.06	0.06 Table R2	No
E13 Gable (insulation at rafter level)	Non Gov Approved Schemes	0.00	0.08	0.08 Table R2	No
E16 Corner (normal)	Non Gov Approved Schemes	10.14	0.09	0.09 Table R2	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	0.00	-0.09	-0.09 Table R2	No
E18 Party wall between dwellings	Non Gov Approved Schemes	10.14	0.06	0.06 Table R2	No
P1 Party wall - Ground floor	Non Gov Approved Schemes	4.41	0.08	0.08 Table R2	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Non Gov Approved Schemes	0.00	0.00	0.00 Table R2	No
P2 Party wall - Intermediate floor within a dwelling	Non Gov Approved Schemes	4.41	0.00	0.00 Table R2	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	4.41	0.12	0.12 Table R2	No

Y-value W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500142
Configuration	1
Manufacturer SFP	0.71
Duct Type	Rigid
MVHR Efficiency	88.00
Wet Rooms	1
SFP from Installer Commissioning Certificate	No
MVHR System Location	Inside heated envelope (installed exclusively)
Duct Installation Specification	Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys	0
Number of open flues	0
Number of chimneys/flues attached to closed fire	0
Number of flues attached to solid fuel boiler	0
Number of flues attached to other heater	0
Number of blocked chimneys	0
Number of intermittent extract fans	0
Number of passive vents	0

Summary for Input Data

Number of flueless gas fires	0				
21.0 Fixed Cooling System	No				
22.0 Pressure Testing	Yes				
Designed AP ₅₀	3.00	m ³ /(h.m ²) @ 50 Pa			
Test Method	Blower Door				
22.0 Lighting	No				
No Fixed Lighting	No				
	Name LEL	Efficacy 85.00	Power 10.00	Capacity 850.00	Count 20
24.0 Main Heating 1	SAP table				
Percentage of Heat	100.00				%
Fuel Type	Electricity				
SAP Code	214				
In Winter	249.90				
In Summer	175.10				
Controls SAP Code	2207				
Controls description	Time and temperature zone control by arrangement				
Is MHS Pumped	Pump in heated space				
Heating Pump Age	2013 or later				
Heat Emitter	Radiators and Underfloor				
Underfloor Heating	Yes - Pipes in thin screed				
Flow Temperature	Enter value				
Flow Temperature Value	35.00				
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 mains				
Bath Count	1				
Supplementary Immersion	No				
Immersion Only Heating Hot Water	No				
28.1 Showers					
Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Mixer shower	Vented hot water system	7.00		No	
28.3 Waste Water Heat Recovery System					
29.0 Hot Water Cylinder	Hot Water Cylinder				
Cylinder Stat	Yes				
Cylinder In Heated Space	Yes				

Summary for Input Data

Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.72	kWh/day
Pipes insulation	All accessible pipework insulated	

31.0 Thermal Store

34.0 Small-scale Hydro

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

Lower cost measures

None

Further measures to achieve even higher standards

None

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Plot Reference	AT14			Issued on Date	07/05/2026
Assessment Reference	Be Green	Plot Type Ref			
Plot Address				SAP Version	10.2
SAP Rating	81 B	DER	4.66	TER	11.65
Environmental	96 A	% DER < TER			60.00
CO ₂ Emissions (t/year)	0.34	DFEE	36.09	TFEE	37.41
Compliance Check	See BREL	% DFEE < TFEE			3.53
% DPER < TPER	18.46	DPER	49.55	TPER	60.77
Assessor Details	Mr. Giles Murgatroyd			Assessor ID	V385-0001
Client	Antler Homes PLC, Antler Homes PLC				

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	39.4900 (1b)	x 2.4100 (2b)	= 95.1709 (1b) - (3b)
First floor	39.4900 (1c)	x 2.6600 (2c)	= 105.0434 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	78.9800		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 200.2143 (5)

2. Ventilation rate

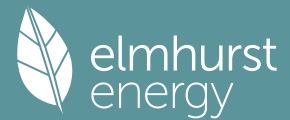
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
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) =												79.2000 (23c)
Effective ac	0.2666	0.2634	0.2602	0.2442	0.2411	0.2251	0.2251	0.2219	0.2315	0.2411	0.2474	0.2538 (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							
DG Win			22.3300	1.1450	25.5687		(27)
Solid door			2.1000	1.0000	2.1000		(26)
FT01			39.4900	0.1300	5.1337		(28a)
WT02 Tile hung	113.2100	24.4300	88.7800	0.1800	15.9804		(29a)
RT01	39.4900		39.4900	0.1100	4.3439		(30)
Total net area of external elements Aum (A, m ²)			192.1900				(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		53.1267		(33)
Main dwelling							
Party Wall 1			22.3600	0.0000	0.0000		(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							250.0000 (35)
List of Thermal Bridges							
K1 Element				Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate				0.0000	0.0500	0.0000	

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E2 Other lintels (including other steel lintels)	15.9200	0.0500	0.7960
E3 Sill	9.9500	0.0500	0.4975
E4 Jamb	31.8000	0.0500	1.5900
E5 Ground floor (normal)	22.3300	0.1600	3.5728
E6 Intermediate floor within a dwelling	22.3300	0.0000	0.0000
E10 Eaves (insulation at ceiling level)	17.9200	0.0600	1.0752
E11 Eaves (insulation at rafter level)	0.0000	0.2400	0.0000
E12 Gable (insulation at ceiling level)	4.4100	0.0600	0.2646
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000
E16 Corner (normal)	10.1400	0.0900	0.9126
E17 Corner (inverted - internal area greater than external area)	0.0000	-0.0900	-0.0000
E18 Party wall between dwellings	10.1400	0.0600	0.6084
P1 Party wall - Ground floor	4.4100	0.0800	0.3528
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000
P2 Party wall - Intermediate floor within a dwelling	4.4100	0.0000	0.0000
P4 Party wall - Roof (insulation at ceiling level)	4.4100	0.1200	0.5292
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			10.1991 (36)
Point Thermal bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	63.3258 (37)

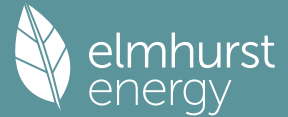
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)												
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	17.6120	17.4014	17.1908	16.1378	15.9272	14.8742	14.8742	14.6636	15.2954	15.9272	16.3484	16.7696 (38)
	80.9378	80.7272	80.5166	79.4636	79.2530	78.2000	78.2000	77.9894	78.6212	79.2530	79.6742	80.0954 (39)
Average = Sum(39)m / 12 =												79.4109
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0248	1.0221	1.0195	1.0061	1.0035	0.9901	0.9901	0.9875	0.9955	1.0035	1.0088	1.0141 (40)
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements (kWh/year)												
Assumed occupancy												2.4432 (42)
Hot water usage for mixer showers												
	65.1845	64.2049	62.7774	60.0463	58.0307	55.7830	54.5054	55.9220	57.4750	59.8883	62.6782	64.9348 (42a)
Hot water usage for baths												
	28.1547	27.7366	27.1477	26.0621	25.2491	24.3477	23.8608	24.4455	25.0821	26.0467	27.1547	28.0595 (42b)
Hot water usage for other uses												
	39.6510	38.2092	36.7673	35.3255	33.8836	32.4418	32.4418	33.8836	35.3255	36.7673	38.2092	39.6510 (42c)
Average daily hot water use (litres/day)												122.2482 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	132.9903	130.1507	126.6925	121.4338	117.1634	112.5724	110.8079	114.2511	117.8825	122.7023	128.0421	132.6453 (44)
Energy conte	210.6241	185.3328	194.7217	166.2368	157.7245	138.4209	134.0125	141.4667	145.3609	166.5059	182.4194	207.6905 (45)
Energy content (annual)										Total = Sum(45)m =		2030.5168
Distribution loss (46)m = 0.15 x (45)m												
	31.5936	27.7999	29.2083	24.9355	23.6587	20.7631	20.1019	21.2200	21.8041	24.9759	27.3629	31.1536 (46)
Water storage loss (or HIU loss):												
Store volume												200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):												1.7200 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.9288 (55)
Total storage loss												
	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (56)
If cylinder contains dedicated solar storage												
	28.7928	26.0064	28.7928	27.8640	28.7928	27.8640	28.7928	28.7928	27.8640	28.7928	27.8640	28.7928 (57)
Primary loss	37.2980	33.6885	37.2980	36.0948	37.2980	36.0948	37.2980	37.2980	36.0948	37.2980	36.0948	37.2980 (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												
	276.7148	245.0277	260.8124	230.1956	223.8152	202.3797	200.1033	207.5575	209.3197	232.5967	246.3782	273.7813 (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												
	276.7148	245.0277	260.8124	230.1956	223.8152	202.3797	200.1033	207.5575	209.3197	232.5967	246.3782	273.7813 (64)
12Total per year (kWh/year)										Total per year (kWh/year) = Sum(64)m =		2808.6822 (64)
Electric shower(s)												2809 (64)
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
Heat gains from water heating, kWh/month												
	122.9051	109.3791	117.6176	106.4408	105.3160	97.1920	97.4318	99.9103	99.4996	108.2358	111.8215	121.9297 (65)

5. Internal gains (see Table 5 and 5a)												
Metabolic gains (Table 5), Watts												
(66)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5												
	109.6006	121.3436	109.6006	113.2540	109.6006	113.2540	109.6006	109.6006	113.2540	109.6006	113.2540	109.6006 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5												
	217.2955	219.5504	213.8682	201.7716	186.5018	172.1504	162.5627	160.3079	165.9900	178.0866	193.3564	207.7079 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5												
	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)												
	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289 (71)
Water heating gains (Table 5)												
	165.1950	162.7665	158.0881	147.8344	141.5538	134.9889	130.9567	134.2880	138.1938	145.4783	155.3076	163.8840 (72)
Total internal gains												
	554.7396	566.3088	544.2054	525.5084	500.3046	480.0416	462.7684	463.8449	477.0862	495.8139	524.5664	543.8409 (73)

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

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North	6.0000	10.6334	0.6300	0.7000	0.7700	19.4982 (74)
South	15.5100	46.7521	0.6300	0.7000	0.7700	221.6075 (78)
Northwest	0.8200	11.2829	0.6300	0.7000	0.7700	2.8275 (81)

Solar gains	243.9332	405.9536	536.0031	641.2514	704.3916	695.0751	671.7457	624.0453	571.7073	442.8498	290.2918	210.0530 (83)
Total gains	798.6728	972.2623	1080.2084	1166.7597	1204.6962	1175.1167	1134.5141	1087.8902	1048.7934	938.6637	814.8582	753.8939 (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	67.7647	67.9415	68.1192	69.0218	69.2053	70.1371	70.1371	70.3265	69.7614	69.2053	68.8394	68.4774
alpha	5.5176	5.5294	5.5413	5.6015	5.6137	5.6758	5.6758	5.6884	5.6508	5.6137	5.5893	5.5652
util living area	0.9768	0.9404	0.8780	0.7561	0.5961	0.4240	0.3030	0.3294	0.5112	0.7886	0.9452	0.9821 (86)
MIT	20.3484	20.5423	20.7156	20.8617	20.9250	20.9430	20.9451	20.9450	20.9384	20.8569	20.5921	20.3126 (87)
Th 2	20.0627	20.0649	20.0672	20.0782	20.0805	20.0916	20.0916	20.0938	20.0871	20.0805	20.0760	20.0716 (88)
util rest of house	0.9704	0.9260	0.8518	0.7141	0.5424	0.3647	0.2406	0.2647	0.4461	0.7410	0.9293	0.9770 (89)
MIT 2	19.3212	19.5598	19.7649	19.9332	19.9951	20.0202	20.0213	20.0237	20.0129	19.9347	19.6339	19.2840 (90)
Living area fraction	19.5023	19.7330	19.9324	20.0969	20.1590	20.1829	20.1841	20.1860	20.1760	20.0972	19.8028	19.4652 (91)
MIT	19.5023	19.7330	19.9324	20.0969	20.1590	20.1829	20.1841	20.1860	20.1760	20.0972	19.8028	19.4652 (92)
Temperature adjustment	19.5023	19.7330	19.9324	20.0969	20.1590	20.1829	20.1841	20.1860	20.1760	20.0972	19.8028	19.4652 (93)
adjusted MIT	19.5023	19.7330	19.9324	20.0969	20.1590	20.1829	20.1841	20.1860	20.1760	20.0972	19.8028	19.4652 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.9656	0.9200	0.8476	0.7150	0.5471	0.3707	0.2470	0.2713	0.4525	0.7420	0.9237	0.9729 (94)
Useful gains	771.2111	894.5279	915.6321	834.1786	659.0935	435.5828	280.2046	295.1423	474.6295	696.4559	752.6691	733.4375 (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	1230.4366	1197.4224	1081.5348	889.7427	670.4023	436.5787	280.2801	295.2714	477.7026	752.6840	1012.0847	1222.6759 (97)
Space heating kWh	341.6638	203.5451	123.4316	40.0061	8.4137	0.0000	0.0000	0.0000	0.0000	41.8337	186.7792	363.9933 (98a)
Space heating requirement - total per year (kWh/year)												1309.6666
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	341.6638	203.5451	123.4316	40.0061	8.4137	0.0000	0.0000	0.0000	0.0000	41.8337	186.7792	363.9933 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1309.6666
Space heating per m2										(98c) / (4) =		16.5823 (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 %) 249.9000 (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	341.6638	203.5451	123.4316	40.0061	8.4137	0.0000	0.0000	0.0000	0.0000	41.8337	186.7792	363.9933 (98)
Space heating efficiency (main heating system 1)	249.9000	249.9000	249.9000	249.9000	249.9000	0.0000	0.0000	0.0000	0.0000	249.9000	249.9000	249.9000 (210)
Space heating fuel (main heating system)	136.7202	81.4506	49.3924	16.0089	3.3668	0.0000	0.0000	0.0000	0.0000	16.7402	74.7416	145.6556 (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	276.7148	245.0277	260.8124	230.1956	223.8152	202.3797	200.1033	207.5575	209.3197	232.5967	246.3782	273.7813 (64)
Efficiency of water heater (217)m	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000	175.1000 (216)
Fuel for water heating, kWh/month	158.0324	139.9359	148.9506	131.4652	127.8214	115.5795	114.2794	118.5366	119.5430	132.8365	140.7072	156.3571 (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	20.6210	18.6254	20.6210	19.9558	20.6210	19.9558	20.6210	20.6210	19.9558	20.6210	19.9558	20.6210 (231)
Lighting	22.3074	17.8958	16.1132	11.8052	9.1187	7.4500	8.3184	10.8125	14.0444	18.4270	20.8133	22.9274 (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												524.0763 (211)
Space heating fuel - main system 2												0.0000 (213)
Space heating fuel - secondary												0.0000 (215)
Efficiency of water heater												175.1000

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Water heating fuel used	1604.0447 (219)
Space cooling fuel	0.0000 (221)
Electricity for pumps and fans: (BalancedWithHeatRecovery, Database: in-use factor = 1.4000, SFP = 0.9940) mechanical ventilation fans (SFP = 0.9940)	242.7959 (230a)
Total electricity for the above, kWh/year	242.7959 (231)
Electricity for lighting (calculated in Appendix L)	180.0334 (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	2550.9502 (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	524.0763	0.1582	82.9127 (261)	
Total CO2 associated with community systems			0.0000 (373)	
Water heating (other fuel)	1604.0447	0.1408	225.8241 (264)	
Space and water heating			308.7368 (265)	
Pumps, fans and electric keep-hot	242.7959	0.1387	33.6788 (267)	
Energy for lighting	180.0334	0.1443	25.9844 (268)	
Total CO2, kg/year			368.3999 (272)	
EPC Dwelling Carbon Dioxide Emission Rate (DER)			4.6600 (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	524.0763	1.5856	830.9801 (275)	
Total CO2 associated with community systems			0.0000 (473)	
Water heating (other fuel)	1604.0447	1.5206	2439.0510 (278)	
Space and water heating			3270.0311 (279)	
Pumps, fans and electric keep-hot	242.7959	1.5128	367.3016 (281)	
Energy for lighting	180.0334	1.5338	276.1412 (282)	
Total Primary energy kWh/year			3913.4739 (286)	
Dwelling Primary energy Rate (DPER)			49.5500 (287)	

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

1. Overall dwelling characteristics

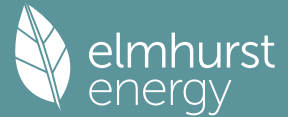
	Area (m2)	Storey height (m)	Volume (m3)	
Main dwelling				
Ground floor	39.4900 (1b)	x 2.4100 (2b)	= 95.1709 (1b) - (3b)	
First floor	39.4900 (1c)	x 2.6600 (2c)	= 105.0434 (1c) - (3c)	
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	78.9800		(4)	
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 200.2143 (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) = 0.1498 (8)
Pressure test		Yes
Pressure Test Method		Blower Door
Measured/design AP50		5.0000 (17)
Infiltration rate		0.3998 (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) =	0.3399 (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	0.4333	0.4248	0.4163	0.3738	0.3654	0.3229	0.3229	0.3144	0.3399	0.3654	0.3823	0.3993 (22b)
Effective ac	0.5939	0.5902	0.5867	0.5699	0.5667	0.5521	0.5521	0.5494	0.5578	0.5667	0.5731	0.5797 (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			2.1000	1.0000	2.1000			(26)
TER Opening Type			17.6600	1.1450	20.2214			(27)
FT01			39.4900	0.1300	5.1337			(28a)
WT02 Tile hung	113.2100	19.7600	93.4500	0.1800	16.8210			(29a)
RT01	39.4900		39.4900	0.1100	4.3439			(30)
Total net area of external elements Aum(A, m2)			192.1900					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		48.6200			(33)
Main dwelling								
Party Wall 1			22.3600	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							250.0000	(35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total	
E1 Steel lintel with perforated steel base plate	0.0000	0.0500	0.0000	
E2 Other lintels (including other steel lintels)	15.9200	0.0500	0.7960	
E3 Sill	9.9500	0.0500	0.4975	
E4 Jamb	31.8000	0.0500	1.5900	
E5 Ground floor (normal)	22.3300	0.1600	3.5728	
E6 Intermediate floor within a dwelling	22.3300	0.0000	0.0000	
E10 Eaves (insulation at ceiling level)	17.9200	0.0600	1.0752	
E11 Eaves (insulation at rafter level)	0.0000	0.0400	0.0000	
E12 Gable (insulation at ceiling level)	4.4100	0.0600	0.2646	
E13 Gable (insulation at rafter level)	0.0000	0.0800	0.0000	
E16 Corner (normal)	10.1400	0.0900	0.9126	
E17 Corner (inverted - internal area greater than external area)	0.0000	-0.0900	-0.0000	
E18 Party wall between dwellings	10.1400	0.0600	0.6084	
P1 Party wall - Ground floor	4.4100	0.0800	0.3528	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	0.0000	0.0000	0.0000	
P2 Party wall - Intermediate floor within a dwelling	4.4100	0.0000	0.0000	
P4 Party wall - Roof (insulation at ceiling level)	4.4100	0.1200	0.5292	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)				10.1991 (36)
Point Thermal bridges			(36a) =	0.0000
Total fabric heat loss			(33) + (36) + (36a) =	58.8191 (37)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	39.2385	38.9976	38.7615	37.6525	37.4450	36.4791	36.4791	36.3003	36.8512	37.4450	37.8648	38.3036	(38)
Heat transfer coeff	98.0575	97.8167	97.5806	96.4716	96.2641	95.2982	95.2982	95.1193	95.6703	96.2641	96.6838	97.1227	(39)
Average = Sum(39)m / 12 =												96.4706	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.2415	1.2385	1.2355	1.2215	1.2188	1.2066	1.2066	1.2043	1.2113	1.2188	1.2242	1.2297	(40)
HLP (average)												1.2215	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

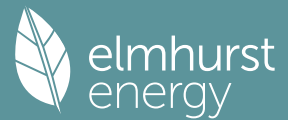
4. Water heating energy requirements (kWh/year)

Assumed occupancy													2.4432 (42)
Hot water usage for mixer showers													
65.1845	64.2049	62.7774	60.0463	58.0307	55.7830	54.5054	55.9220	57.4750	59.8883	62.6782	64.9348	64.9348	(42a)
Hot water usage for baths													
28.1547	27.7366	27.1477	26.0621	25.2491	24.3477	23.8608	24.4455	25.0821	26.0467	27.1547	28.0595	28.0595	(42b)
Hot water usage for other uses													
39.6510	38.2092	36.7673	35.3255	33.8836	32.4418	32.4418	33.8836	35.3255	36.7673	38.2092	39.6510	39.6510	(42c)
Average daily hot water use (litres/day)													122.2482 (43)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	132.9903	130.1507	126.6925	121.4338	117.1634	112.5724	110.8079	114.2511	117.8825	122.7023	128.0421	132.6453	(44)
Energy conte	210.6241	185.3328	194.7217	166.2368	157.7245	138.4209	134.0125	141.4667	145.3609	166.5059	182.4194	207.6905	(45)
Energy content (annual)													Total = Sum(45)m = 2030.5168
Distribution loss (46)m = 0.15 x (45)m													
31.5936	27.7999	29.2083	24.9355	23.6587	20.7631	20.1019	21.2200	21.8041	24.9759	27.3629	31.1536	31.1536	(46)
Water storage loss (or HIU loss):													
Store volume													200.0000 (47)
a) If manufacturer declared loss factor is known (kWh/day):													1.6525 (48)
Temperature factor from Table 2b													0.5400 (49)
Enter (49) or (54) in (55)													0.8924 (55)
Total storage loss													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(56)
If cylinder contains dedicated solar storage													
27.6637	24.9865	27.6637	26.7713	27.6637	26.7713	27.6637	27.6637	27.6637	26.7713	27.6637	26.7713	27.6637	(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													
261.5501	231.3306	245.6478	215.5201	208.6506	187.7042	184.9386	192.3928	194.6442	217.4320	231.7027	258.6166	258.6166	(62)
WWHRS	-29.7996	-26.3550	-27.5975	-22.8518	-21.2971	-18.2240	-17.0821	-18.1651	-18.8553	-22.2283	-25.1820	-29.2478	(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													
231.7505	204.9755	218.0503	192.6683	187.3535	169.4802	167.8565	174.2277	175.7889	195.2036	206.5207	229.3688	229.3688	(64)
12Total per year (kWh/year)													Total per year (kWh/year) = Sum(64)m = 2353.2445 (64)
Electric shower(s)													2353 (64)
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	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													
110.7734	98.4214	105.4858	94.7004	93.1842	85.4516	85.3000	87.7786	87.7592	96.1041	100.0811	109.7980	109.7980	(65)

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

Metabolic gains (Table 5), Watts													
(66)m	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	122.1611	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													

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Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	109.5948	121.3371	109.5948	113.2480	109.5948	113.2480	109.5948	109.5948	113.2480	109.5948	113.2480	109.5948 (67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	217.2955	219.5504	213.8682	201.7716	186.5018	172.1504	162.5627	160.3079	165.9900	178.0866	193.3564	207.7079 (68)
Pumps, fans	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161	35.2161 (69)
Losses e.g. evaporation (negative values) (Table 5)	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000 (70)
Water heating gains (Table 5)	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289	-97.7289 (71)
Total internal gains	148.8889	146.4603	141.7820	131.5283	125.2476	118.6828	114.6506	117.9819	121.8877	129.1721	139.0015	147.5779 (72)
	538.4276	549.9962	527.8934	509.1962	483.9926	463.7295	446.4565	447.5330	460.7741	479.5019	508.2543	527.5289 (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			
North				4.7600	10.6334	0.6300	0.7000	0.7700	15.4686 (74)			
South				12.2500	46.7521	0.6300	0.7000	0.7700	175.0285 (78)			
Northwest				0.6500	11.2829	0.6300	0.7000	0.7700	2.2413 (81)			
Solar gains	192.7384	320.7751	423.5949	506.8756	556.8857	549.5657	531.1011	493.3138	451.8461	349.9449	229.3711	165.9665 (83)
Total gains	731.1660	870.7713	951.4883	1016.0718	1040.8783	1013.2952	977.5575	940.8468	912.6201	829.4468	737.6254	693.4954 (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	55.9337	56.0715	56.2071	56.8532	56.9758	57.5533	57.5533	57.6615	57.3294	56.9758	56.7284	56.4721
alpha	4.7289	4.7381	4.7471	4.7902	4.7984	4.8369	4.8369	4.8441	4.8220	4.7984	4.7819	4.7648
util living area	0.9877	0.9721	0.9445	0.8793	0.7599	0.5802	0.4248	0.4589	0.6738	0.8953	0.9736	0.9902 (86)
MIT	19.7779	20.0271	20.3101	20.6331	20.8602	20.9705	20.9946	20.9922	20.9394	20.6534	20.1620	19.7358 (87)
Th 2	19.8869	19.8893	19.8917	19.9029	19.9050	19.9147	19.9147	19.9165	19.9110	19.9050	19.9007	19.8963 (88)
util rest of house	0.9838	0.9638	0.9281	0.8449	0.6978	0.4909	0.3222	0.3540	0.5861	0.8577	0.9642	0.9871 (89)
MIT 2	18.5009	18.8147	19.1651	19.5538	19.7958	19.8992	19.9132	19.9140	19.8746	19.5880	18.9961	18.4544 (90)
Living area fraction	18.7260	19.0284	19.3669	19.7440	19.9834	20.0880	20.1038	20.1041	fLA = Living area / (4) =	20.0623	19.7758	19.2016
MIT	18.7260	19.0284	19.3669	19.7440	19.9834	20.0880	20.1038	20.1041	20.0623	19.7758	19.2016	18.6802 (92)
Temperature adjustment												0.0000
adjusted MIT	18.7260	19.0284	19.3669	19.7440	19.9834	20.0880	20.1038	20.1041	20.0623	19.7758	19.2016	18.6802 (93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9782	0.9554	0.9185	0.8391	0.7027	0.5057	0.3403	0.3725	0.5990	0.8525	0.9563	0.9822 (94)
Ext temp.	715.2169	831.9253	873.9607	852.6186	731.3792	512.4494	332.6812	350.4301	546.6933	707.0955	705.3647	681.1830 (95)
Heat loss rate W	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Space heating kWh	1414.5735	1381.9908	1255.5599	1046.1405	797.3906	522.9965	333.9014	352.3278	570.4143	883.2956	1170.0296	1406.3585 (97)
Space heating requirement - total per year (kWh/year)	520.3213	369.6440	283.9098	139.3358	49.1125	0.0000	0.0000	0.0000	0.0000	131.0928	334.5587	539.5306 (98a)
Solar heating kWh	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (98b)
Solar heating contribution - total per year (kWh/year)	520.3213	369.6440	283.9098	139.3358	49.1125	0.0000	0.0000	0.0000	0.0000	131.0928	334.5587	539.5306 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												2367.5056
Space heating per m2										(98c) / (4) =		29.9760 (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
520.3213	369.6440	283.9098	139.3358	49.1125	0.0000	0.0000	0.0000	0.0000	0.0000	131.0928	334.5587	539.5306 (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)	563.7284	400.4810	307.5946	150.9597	53.2096	0.0000	0.0000	0.0000	0.0000	142.0291	362.4688	584.5402 (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	231.7505	204.9755	218.0503	192.6683	187.3535	169.4802	167.8565	174.2277	175.7889	195.2036	206.5207	229.3688 (64)
Efficiency of water heater (217)m	85.8175	85.3657	84.6527	83.3451	81.5159	79.8000	79.8000	79.8000	79.8000	83.1873	85.1352	79.8000 (216)
Fuel for water heating, kWh/month	270.0503	240.1147	257.5822	231.1693	229.8367	212.3812	210.3465	218.3304	220.2869	234.6556	242.5797	266.9883 (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)

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Lighting	22.7716	18.2683	16.4485	12.0509	9.3085	7.6051	8.4915	11.0376	14.3367	18.8105	21.2465	23.4045	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-36.8141	-51.8367	-74.4273	-83.5949	-90.0730	-84.0489	-82.9986	-78.3749	-70.2229	-59.2131	-40.4448	-31.8346	(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	-21.0070	-44.1652	-87.7340	-131.7058	-174.0892	-174.9002	-172.8527	-146.3935	-107.3473	-63.1536	-28.0449	-16.6149	(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												2565.0115	(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												2834.3219	(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)												183.7802	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-1951.8922	(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												3717.2213	(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	2565.0115	0.2100	538.6524 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2834.3219	0.2100	595.2076 (264)
Space and water heating			1133.8600 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	183.7802	0.1443	26.5252 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-783.8838	0.1346	-105.5187
PV Unit electricity exported	-1168.0084	0.1259	-147.0633
Total			-252.5820 (269)
Total CO2, kg/year			919.7324 (272)
EPC Target Carbon Dioxide Emission Rate (TER)			11.6500 (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	2565.0115	1.1300	2898.4629 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2834.3219	1.1300	3202.7837 (278)
Space and water heating			6101.2466 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	183.7802	1.5338	281.8882 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-783.8838	1.4975	-1173.8643
PV Unit electricity exported	-1168.0084	0.4622	-539.8242
Total			-1713.6884 (283)
Total Primary energy kWh/year			4799.5472 (286)
Target Primary Energy Rate (TPER)			60.7700 (287)

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