

Summary for Input Data

Plot Reference	A 905	Issued on Date	19/03/2026
Assessment Reference	Be Green	Plot Type Ref	
Plot Address		SAP Version	10.2

SAP Rating	82 B	DER	5.02	TER	14.30
Environmental	96 A	% DER < TER			64.90
CO ₂ Emissions (t/year)	0.38	DFEE	37.61	TFEE	39.65
Compliance Check	See BREL	% DFEE < TFEE			5.13
% DPER < TPER	31.57	DPER	52.80	TPER	77.16

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

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

Orientation	Southeast	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Top-floor flat	
Which Floor	9	
2.0 Number of Storeys	1	
3.0 Date Built	2026	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	156.67	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground floor:	34.12 m	86.41 m ²	2.80 m

8.0 Living Area	38.77	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
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.15	70.00	54.88	41.43	0.00	None	13.45	Enter Gross Area
Corridor wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.22	70.00	40.66	38.24	0.70	Stairwell Access Corridor 3	2.42	Enter Gross Area

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	0.00	70.00	27.86	0.00	None

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

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof 1	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	86.41	86.41	None	0.00	Enter Gross Area	0.00

11.1 Party Floors

Summary for Input Data



Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Precast concrete planks floor, screed, carpeted	40.00	86.41

12.0 Opening Types

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

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Door	Door	Corridor wall	South East	2.42	
NW windows	Window	External Wall 1	North West	7.48	
NE windows	Window	External Wall 1	North East	5.96	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E1 Steel lintel with perforated steel base plate	Independently assessed	8.49	0.05	0.05	No
E4 Jamb	Independently assessed	21.60	0.04	0.04	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	15.24	0.05	0.05	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	14.52	0.04	0.04	No
E9 Balcony between dwellings, wall insulation continuous	Independently assessed	4.36	0.05	0.05	No
E16 Corner (normal)	Independently assessed	5.60	0.05	0.05	No
E16 Corner (normal)	Independently assessed	5.60	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Table K1 - Default	2.80	0.00	0.00	No
E18 Party wall between dwellings	Independently assessed	2.80	0.05	0.05	No
E25 Staggered party wall between dwellings	Independently assessed	2.80	0.04	0.04	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Table K1 - Default	9.95	0.00	0.00	No
E3 Sill	Independently assessed	4.99	0.04	0.04	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	9.95	0.05	0.05	No

Y-value

0.02 W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Yes

Approved Installation

Yes

Mechanical Ventilation data Type

Database

Type

Balanced mechanical ventilation with heat recovery

MV Reference Number

500625

Configuration

2

Manufacturer SFP

0.61

Duct Type

Rigid

MVHR Efficiency

89.00

Wet Rooms

2

SFP from Installer Commissioning Certificate

No

MVHR System Location

Inside heated envelope (installed exclusively)

Duct Installation Specification

Level 1

20.0 Fans, Open Fireplaces, Flues

Number of open chimneys

0

Number of open flues

0

Number of chimneys/flues attached to closed fire

0

Number of flues attached to solid fuel boiler

0

Number of flues attached to other heater

0

Number of blocked chimneys

0

Number of intermittent extract fans

0

Summary for Input Data

Number of passive vents

Number of flueless gas fires

21.0 Fixed Cooling System

22.0 Pressure Testing

Designed AP₅₀ m²/(h.m²) @ 50 Pa

Test Method

22.0 Lighting
No Fixed Lighting

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	15.00	1125.00	8

24.0 Main Heating 1

25.0 Main Heating 2

26.0 Heat Networks

Space Community Heating

Distribution Loss

Distribution Loss Value

SAP Code

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	Heat pump	Electricity	Space and Water	232.00	100.00					
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

27.0 Secondary Heating

28.0 Water Heating

Water Heating

SAP Code

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

Cold Water Source

Bath Count

28.1 Showers

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

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Insulation Type

Cylinder Volume L

Loss kWh/day

32.0 Photovoltaic Unit

Export Capable Meter?

Connected To Dwelling

Diverter

Summary for Input Data



Battery Capacity [kWh]

0.00

PV Cells kWp

Orientation

Elevation

Overshading

FGHRS

MCS Certificate

**Overshading
Factor**

**MCS
Certificate
Reference**

**Panel
Manufacturer**

0.41

South West

Horizontal

Modest

No

0.80

34.0 Small-scale Hydro

None

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Recommendations

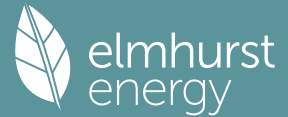
Lower cost measures

None

Further measures to achieve even higher standards

None

Full SAP Calculation Printout



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Environmental	96 A	% DER < TER				64.90	
CO ₂ Emissions (t/year)	0.38	DFEE	37.61	TFEE	39.65		
Compliance Check	See BREL	% DFEE < TFEE				5.13	
% DPER < TPER	31.57	DPER	52.80	TPER	77.16		
Assessor Details	Mr. Robert Tanner				Assessor ID	W344-0001	
Client							

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

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	86.4100 (1b)	2.8000 (2b)	241.9480 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	86.4100		241.9480 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	241.9480 (5)

2. Ventilation rate

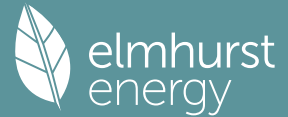
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	0 * 10 = 0.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	0.0000 / (5) = 0.0000 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.1500 (18)
Number of sides sheltered	2 (19)
Shelter factor	(20) = 1 - [0.075 x (19)] = 0.8500 (20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) = 0.1275 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.1626	0.1594	0.1562	0.1403	0.1371	0.1211	0.1211	0.1179	0.1275	0.1371	0.1434	0.1498 (22b)
Balanced mechanical ventilation with heat recovery												
If mechanical ventilation												0.5000 (23a)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.5000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												80.1000 (23c)
Effective ac	0.2621	0.2589	0.2557	0.2397	0.2366	0.2206	0.2206	0.2174	0.2270	0.2366	0.2429	0.2493 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			2.4200	1.0000	2.4200		(26)
Window			13.4500	1.1450	15.4008		(27)
External Wall 1	54.8800	13.4500	41.4300	0.1500	6.2145	70.0000	2900.1001 (29a)
Corridor wall	40.6600	2.4200	38.2400	0.1900	7.2656	70.0000	2676.8000 (29a)
External Roof 1	86.4100		86.4100	0.1000	8.6410	9.0000	777.6900 (30)
Total net area of external elements Aum(A, m ²)			181.9500				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	39.9419		(33)
Main dwelling							
Party Wall 1			27.8600	0.0000	0.0000	70.0000	1950.2000 (32)
Party Floor 1			86.4100			40.0000	3456.4000 (32d)
Internal Wall 1			197.4300			9.0000	1776.8699 (32c)
Heat capacity Cm = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13538.0600 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							156.6724 (35)
List of Thermal Bridges							

Full SAP Calculation Printout



K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	8.4900	0.0500	0.4245
E4 Jamb	21.6000	0.0400	0.8640
E7 Party floor between dwellings (in blocks of flats)	15.2400	0.0500	0.7620
E7 Party floor between dwellings (in blocks of flats)	14.5200	0.0390	0.5663
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0500	0.2180
E16 Corner (normal)	5.6000	0.0500	0.2800
E16 Corner (normal)	5.6000	0.0390	0.2184
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	9.9500	0.0000	0.0000
E3 Sill	4.9900	0.0400	0.1996
P4 Party wall - Roof (insulation at ceiling level)	9.9500	0.0500	0.4975
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.2795 (36)
Point Thermal bridges			(36a) = 0.0000
Total fabric heat loss		(33) + (36) + (36a) =	44.2213 (37)

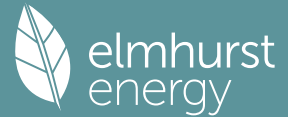
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)													
(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat transfer coeff	20.9238	20.6693	20.4148	19.1423	18.8878	17.6153	17.6153	17.3608	18.1243	18.8878	19.3968	19.9058	(38)
Average = Sum(39)m / 12 =	65.1452	64.8907	64.6362	63.3637	63.1092	61.8367	61.8367	61.5822	62.3457	63.1092	63.6182	64.1272	(39)
	63.3000												
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP (average)	0.7539	0.7510	0.7480	0.7333	0.7303	0.7156	0.7156	0.7127	0.7215	0.7303	0.7362	0.7421	(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													2.5733 (42)
Hot water usage for mixer showers													
Hot water usage for baths	65.6640	64.6586	63.1771	60.8980	58.8559	55.9991	53.7395	56.3811	57.7097	60.5392	63.4860	65.6048	(42a)
Hot water usage for other uses	28.4442	28.0149	27.4040	26.4892	25.6648	24.5299	23.6689	24.7218	25.2743	26.3988	27.5680	28.4217	(42b)
Average daily hot water use (litres/day)	40.9834	39.4931	38.0028	36.5125	35.0222	33.5319	33.5319	35.0222	36.5125	38.0028	39.4931	40.9834	(42c)
													124.1693 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	135.0916	132.1666	128.5839	123.8997	119.5429	114.0609	110.9403	116.1251	119.4965	124.9409	130.5471	135.0099	(44)
Energy content (annual)	198.8782	174.8832	183.7438	161.8440	154.0432	131.9076	122.5923	136.6813	138.6100	160.9990	176.4387	198.2719	(45)
Distribution loss (46)m = 0.15 x (45)m	29.8317	26.2325	27.5616	24.2766	23.1065	19.7861	18.3889	20.5022	20.7915	24.1498	26.4658	29.7408	(46)
Water storage loss (or HIU loss):													
Store volume													110.0000 (47)
b) If manufacturer declared loss factor is not known :													
Hot water storage loss factor from Table 2 (kWh/litre/day)													0.0152 (51)
Volume factor from Table 2a													1.0294 (52)
Temperature factor from Table 2b													0.6000 (53)
Enter (49) or (54) in (55)													1.0327 (55)
Total storage loss	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144	(56)
If cylinder contains dedicated solar storage													
Primary loss	32.0144	28.9162	32.0144	30.9817	32.0144	30.9817	32.0144	32.0144	30.9817	32.0144	30.9817	32.0144	(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	254.1550	224.8106	239.0206	215.3377	209.3200	185.4013	177.8691	191.9581	192.1037	216.2758	229.9324	253.5487	(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)	254.1550	224.8106	239.0206	215.3377	209.3200	185.4013	177.8691	191.9581	192.1037	216.2758	229.9324	253.5487	(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													
	110.3484	98.0906	105.3163	96.6081	95.4408	86.6542	84.9834	89.6680	88.8828	97.7536	101.4608	110.1468	(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	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	(66)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	122.9244	136.0949	122.9244	127.0219	122.9244	127.0219	122.9244	122.9244	127.0219	122.9244	127.0219	122.9244	(67)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	232.3159	234.7266	228.6517	215.7189	199.3936	184.0501	173.7997	171.3890	177.4639	190.3967	206.7220	222.0655	(68)
Pumps, fans	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	(69)
Losses e.g. evaporation (negative values) (Table 5)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(70)
Water heating gains (Table 5)	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	(71)
Total internal gains	148.3178	145.9682	141.5541	134.1779	128.2806	120.3531	114.2250	120.5215	123.4483	131.3893	140.9178	148.0468	(72)
	565.1580	578.3896	554.7301	538.5186	512.1986	493.0250	472.5490	476.4348	489.5340	506.3103	536.2616	554.6367	(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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Northeast	5.9600		11.2829		0.3500		0.7000		0.7700		11.4174 (75)	
Northwest	7.4900		11.2829		0.3500		0.7000		0.7700		14.3484 (81)	
Solar gains	25.7658	52.4471	94.4929	155.1845	208.5985	222.3881	208.0395	165.8515	115.1411	64.0945	32.4201	21.0417 (83)
Total gains	590.9239	630.8366	649.2231	693.7031	720.7970	715.4131	680.5885	642.2863	604.6751	570.4048	568.6817	575.6783 (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	57.7260	57.9524	58.1806	59.3490	59.5884	60.8146	60.8146	61.0659	60.3181	59.5884	59.1116	58.6424
util living area	4.8484	4.8635	4.8787	4.9566	4.9726	5.0543	5.0543	5.0711	5.0212	4.9726	4.9408	4.9095
	0.9756	0.9641	0.9421	0.8709	0.7372	0.5404	0.3974	0.4371	0.6688	0.8852	0.9565	0.9780 (86)
MIT	19.9973	20.1433	20.3605	20.6793	20.8904	20.9819	20.9968	20.9950	20.9490	20.7011	20.3293	19.9882 (87)
Th 2	20.2935	20.2960	20.2986	20.3115	20.3141	20.3271	20.3271	20.3297	20.3219	20.3141	20.3089	20.3038 (88)
util rest of house	0.9713	0.9578	0.9316	0.8489	0.6982	0.4878	0.3377	0.3751	0.6149	0.8611	0.9479	0.9741 (89)
MIT 2	19.1162	19.3018	19.5752	19.9719	20.2119	20.3139	20.3254	20.3269	20.2810	20.0054	19.5471	19.1124 (90)
Living area fraction	MIT	19.5115	19.6793	19.9276	20.2893	20.5163	20.6136	20.6267	20.5807	20.3175	19.8981	19.5053 (92)
Temperature adjustment												0.0000
adjusted MIT	19.5115	19.6793	19.9276	20.2893	20.5163	20.6136	20.6267	20.6267	20.5807	20.3175	19.8981	19.5053 (93)
8. Space heating requirement												
Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Useful gains	0.9654	0.9512	0.9253	0.8481	0.7102	0.5105	0.3644	0.4028	0.6361	0.8612	0.9419	0.9685 (94)
Ext temp.	570.4762	600.0476	600.7385	588.3458	511.8813	365.1950	248.0139	258.6947	384.6251	491.2451	535.6460	557.5637 (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	990.9573	959.0416	867.9060	721.6673	556.3919	371.8607	248.9961	260.2882	404.0454	613.2649	814.1911	981.4873 (97)
Space heating requirement - total per year (kWh/year)	312.8379	241.2440	198.7726	95.9915	33.1159	0.0000	0.0000	0.0000	0.0000	90.7827	200.5525	315.3992 (98a)
Solar heating kWh												1488.6963
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	312.8379	241.2440	198.7726	95.9915	33.1159	0.0000	0.0000	0.0000	0.0000	90.7827	200.5525	315.3992 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1488.6963
Space heating per m2										(98c) / (4) =		17.2283 (99)
9b. Energy requirements												
Fraction of space heat from secondary/supplementary system (Table 11)												0.0000 (301)
Fraction of space heat from community system												1.0000 (302)
Fraction of heat from community Heat pump-Space and Water												1.0000 (303a)
Factor for control and charging method (Table 4c(3)) for space heating												1.0000 (305)
Factor for charging method (Table 4c(3)) for water heating												1.0000 (305a)
Distribution loss factor (Table 12c) for community heating system												1.5000 (306)
Efficiency of secondary/supplementary heating system, %												0.0000 (208)
Space heating:												
Space heating requirement	312.8379	241.2440	198.7726	95.9915	33.1159	0.0000	0.0000	0.0000	0.0000	90.7827	200.5525	315.3992 (98)
Space heat from Heat pump = (98) x 1.00 x 1.00 x 1.50												
307a	469.2569	361.8660	298.1589	143.9873	49.6738	0.0000	0.0000	0.0000	0.0000	136.1741	300.8288	473.0988
Space heating requirement	469.2569	361.8660	298.1589	143.9873	49.6738	0.0000	0.0000	0.0000	0.0000	136.1741	300.8288	473.0988 (307)
Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)												0.0000 (308)
Space heating fuel for secondary/supplementary system	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (309)
Water heating												
Annual water heating requirement	254.1550	224.8106	239.0206	215.3377	209.3200	185.4013	177.8691	191.9581	192.1037	216.2758	229.9324	253.5487 (64)
Water heat from Heat pump = (64) x 1.00 x 1.00 x 1.50												
310a	381.2325	337.2159	358.5309	323.0065	313.9800	278.1020	266.8037	287.9372	288.1555	324.4137	344.8986	380.3230
Water heating fuel	381.2325	337.2159	358.5309	323.0065	313.9800	278.1020	266.8037	287.9372	288.1555	324.4137	344.8986	380.3230 (310)
Cooling System Energy Efficiency Ratio												0.0000 (314)
Space coolin	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (315)
Pumps and Fa	19.1157	17.2658	19.1157	18.4991	19.1157	18.4991	19.1157	19.1157	18.4991	19.1157	18.4991	19.1157 (331)
Lighting	26.7234	21.4385	19.3030	14.1422	10.9238	8.9249	9.9651	12.9530	16.8247	22.0749	24.9335	27.4661 (332)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333a)m	-4.4872	-7.9599	-14.6718	-20.6267	-25.7619	-25.3974	-24.8668	-21.4121	-16.1131	-10.3733	-5.3864	-3.6637 (333a)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(334a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (334a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(335a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (335a)
Electricity generated by PVs (Appendix M) (negative quantity)												
(333b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (333b)
Electricity generated by wind turbines (Appendix M) (negative quantity)												
(334b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (334b)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)												
(335b)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (335b)
Annual totals kWh/year												
Space heating fuel - community heating												2233.0444 (307)
Space heating fuel - secondary												0.0000 (309)
Water heating fuel - community heating												3884.5995 (310)
Efficiency of water heater												0.0000 (311)
Electricity used for heat distribution												22.3304 (313)
Space cooling fuel												0.0000 (321)
Electricity for pumps and fans:												
(BalancedWithHeatRecovery, Database: in-use factor = 1.2500, SFP = 0.7625)												
mechanical ventilation fans (SFP = 0.7625)												225.0721 (330a)
Total electricity for the above, kWh/year												225.0721 (331)

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Electricity for lighting (calculated in Appendix L)	215.6728 (332)
Energy saving/generation technologies (Appendices M ,N and Q)	
PV generation	-180.7203 (333)
Wind generation	0.0000 (334)
Hydro-electric generation (Appendix N)	0.0000 (335a)
Electricity generated - Micro CHP (Appendix N)	0.0000 (335)
Appendix Q - special features	
Energy saved or generated	-0.0000 (336)
Energy used	0.0000 (337)
Total delivered energy for all uses	6377.6686 (338)

12b. Carbon dioxide emissions - Community heating scheme

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Efficiency of heat source Heat pump			232.0000 (367)
Space and Water heating from Heat pump	2636.9155	0.1559	150.0917 (367)
Electrical energy for heat distribution (space & water)	22.3304	0.0000	8.9538 (372)
Overall CO2 factor for heat network			0.0646 (386)
Total CO2 associated with community systems			394.8947 (373)
Space and water heating			394.8947 (376)
Pumps, fans and electric keep-hot	225.0721	0.1387	31.2203 (378)
Energy for lighting	215.6728	0.1443	31.1283 (379)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-180.7203	0.1306	-23.5931
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-23.5931 (380)
Total CO2, kg/year			433.6501 (383)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			5.0200 (384)

13b. Primary energy - Community heating scheme

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Efficiency of heat source Heat pump			232.0000 (467a)
Space and Water heating from Heat pump	2636.9155	1.5773	1518.2018 (467)
Electrical energy for heat distribution (space & water)	22.3304	0.0000	94.3005 (472)
Overall CO2 factor for heat network			0.6798 (486)
Total CO2 associated with community systems			4158.9777 (473)
Space and water heating			4158.9777 (476)
Pumps, fans and electric keep-hot	225.0721	1.5128	340.4891 (478)
Energy for lighting	215.6728	1.5338	330.8062 (479)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-180.7203	1.4823	-267.8738
PV Unit electricity exported	0.0000	0.0000	0.0000
Total			-267.8738 (480)
Total Primary energy kWh/year			4562.3992 (483)
Dwelling Primary energy Rate (DPER)			52.8000 (484)

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

1. Overall dwelling characteristics

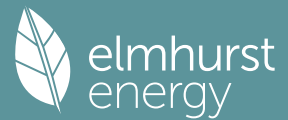
	Area (m2)	Storey height (m)	Volume (m3)
Main dwelling	86.4100 (1b)	2.8000 (2b)	241.9480 (1b) - (3b)
Ground floor			
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	86.4100		241.9480 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	241.9480 (5)

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) = 0.1240 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	5.0000 (17)
Infiltration rate	0.3740 (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) = 0.3179 (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												
	0.4053	0.3974	0.3894	0.3497	0.3417	0.3020	0.3020	0.2941	0.3179	0.3417	0.3576	0.3735 (22b)
Effective ac	0.5821	0.5790	0.5758	0.5611	0.5584	0.5456	0.5456	0.5432	0.5505	0.5584	0.5640	0.5698 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Main dwelling							
TER Opaque door			2.4200	1.0000	2.4200		(26)
TER Opening Type			13.4500	1.1450	15.4008		(27)
External Wall 1	54.8800	13.4500	41.4300	0.1800	7.4574		(29a)
Corridor wall	40.6600	2.4200	38.2400	0.1800	6.8832		(29a)
External Roof 1	86.4100		86.4100	0.1100	9.5051		(30)
Total net area of external elements Aum(A, m2)			181.9500				(31)
Fabric heat loss, W/K = Sum (A x U)					41.6665		(33)
Main dwelling							
Party Wall 1			27.8600	0.0000	0.0000		(32)

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

156.6724 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate	8.4900	0.0500	0.4245
E4 Jamb	21.6000	0.0500	1.0800
E7 Party floor between dwellings (in blocks of flats)	15.2400	0.0700	1.0668
E7 Party floor between dwellings (in blocks of flats)	14.5200	0.0700	1.0164
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0200	0.0872
E16 Corner (normal)	5.6000	0.0900	0.5040
E16 Corner (normal)	5.6000	0.0900	0.5040
E17 Corner (inverted - internal area greater than external area)	2.8000	-0.0900	-0.2520
E18 Party wall between dwellings	2.8000	0.0600	0.1680
E25 Staggered party wall between dwellings	2.8000	0.0600	0.1680
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	9.9500	0.0000	0.0000
E3 Sill	4.9900	0.0500	0.2495
P4 Party wall - Roof (insulation at ceiling level)	9.9500	0.1200	1.1940

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

(36a) = 0.0000

Point Thermal bridges

(33) + (36) + (36a) = 47.8769 (37)

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
	46.4797	46.2251	45.9754	44.8030	44.5836	43.5624	43.5624	43.3733	43.9558	44.5836	45.0274	45.4913 (38)
Heat transfer coeff	94.3566	94.1019	93.8523	92.6798	92.4605	91.4393	91.4393	91.2502	91.8326	92.4605	92.9042	93.3682 (39)
Average = Sum(39)m / 12 =												92.6788

HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0920	1.0890	1.0861	1.0726	1.0700	1.0582	1.0582	1.0560	1.0628	1.0700	1.0752	1.0805 (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											2.5733 (42)
Hot water usage for mixer showers											
66.3536	64.8783	62.0557	59.9727	57.6498	56.3294	57.7935	59.3984	61.8925	64.7758	67.1078 (42a)	
Hot water usage for baths											
29.0928	28.6607	28.0523	26.9304	26.0904	25.1589	24.6558	25.2600	25.9178	26.9145	28.0595	28.9944 (42b)
Hot water usage for other uses											
40.9834	39.4931	38.0028	36.5125	35.0222	33.5319	33.5319	35.0222	36.5125	38.0028	39.4931	40.9834 (42c)
Average daily hot water use (litres/day)											126.3404 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	137.4422	134.5074	130.9334	125.4987	121.0853	116.3406	114.5171	118.0757	121.8287	126.8099	132.3284	137.0857 (44)
Energy conte	217.6748	191.5368	201.2398	171.8014	163.0041	143.0543	138.4985	146.2023	150.2270	172.0798	188.5260	214.6431 (45)
Energy content (annual)										Total = Sum(45)m =		2098.4879

Water storage loss (or HIU loss):												
Store volume												180.0000 (47)

a) If manufacturer declared loss factor is known (kWh/day):												1.5520 (48)
Temperature factor from Table 2b												0.5400 (49)
Enter (49) or (54) in (55)												0.8381 (55)

Total storage loss												
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (56)

If cylinder contains dedicated solar storage												
25.9803	23.4661	25.9803	25.1422	25.9803	25.1422	25.9803	25.9803	25.9803	25.1422	25.9803	25.1422	25.9803 (57)

Primary loss	23.2624	21.0112	23.2624	22.5120	23.2624	22.5120	23.2624	23.2624	22.5120	23.2624	22.5120	23.2624 (59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)

Combi 1888	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
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WWHRS	-30.7969	-27.2370	-28.5210	-23.6166	-22.0098	-18.8339	-17.6538	-18.7730	-19.4863	-22.9722	-26.0247	-30.2266 (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)

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												

12Total per year (kWh/year)												2392.1287 (64)
Electric shower(s)												2392 (64)

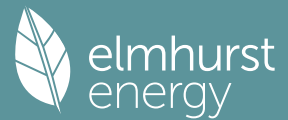
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (64a)
												0.0000 (64a)

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)

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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Full SAP Calculation Printout



(66)m	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	122.9244	136.0949	122.9244	127.0219	122.9244	127.0219	122.9244	122.9244	127.0219	122.9244	127.0219	122.9244	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	232.3159	234.7266	228.6517	215.7189	199.3936	184.0501	173.7997	171.3890	177.4639	190.3967	206.7220	222.0655	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	0.0000	0.0000	0.0000	0.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	(71)
Water heating gains (Table 5)	150.2298	147.7199	142.8849	132.2879	125.7970	119.0124	114.8453	118.2882	122.3248	129.8530	140.0115	148.8750	(72)
Total internal gains	570.0701	583.1413	559.0609	539.6287	512.7150	491.6843	473.1693	474.2015	488.4105	507.7741	538.3553	558.4648	(73)

6. Solar gains

[Jan]					Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
Northeast					5.9600	11.2829	0.6300	0.7000			0.7700			20.5514 (75)
Northwest					7.4900	11.2829	0.6300	0.7000			0.7700			25.8271 (81)
Solar gains	46.3785	94.4047	170.0873	279.3322	375.4773	400.2985	374.4710	298.5327	207.2540	115.3701	58.3561			37.8750 (83)
Total gains	616.4486	677.5460	729.1482	818.9609	888.1922	891.9828	847.6404	772.7342	695.6645	623.1441	596.7114			596.3398 (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	39.8549	39.9628	40.0690	40.5760	40.6722	41.1264	41.1264	41.2117	40.9503	40.6722	40.4779	40.2768		
alpha	3.6570	3.6642	3.6713	3.7051	3.7115	3.7418	3.7418	3.7474	3.7300	3.7115	3.6985	3.6851		
util living area	0.9801	0.9703	0.9503	0.8910	0.7748	0.6022	0.4588	0.5165	0.7503	0.9192	0.9682	0.9823	(86)	
MIT	19.2640	19.4665	19.8048	20.2965	20.6914	20.9133	20.9759	20.9628	20.7989	20.3013	19.7193	19.2386	(87)	
Th 2	20.0074	20.0098	20.0122	20.0233	20.0254	20.0351	20.0351	20.0369	20.0314	20.0254	20.0212	20.0212	(88)	
util rest of house	0.9760	0.9643	0.9397	0.8675	0.7281	0.5277	0.3648	0.4190	0.6835	0.8967	0.9606	0.9786	(89)	
MIT 2	17.9888	18.2464	18.6736	19.2848	19.7417	19.9743	20.0239	20.0181	19.8714	19.3042	18.5768	17.9627	(90)	
Living area fraction									fLA = Living area / (4) =			0.4487	(91)	
MIT	18.5609	18.7938	19.1811	19.7387	20.1678	20.3956	20.4510	20.4420	20.2876	19.7516	19.0894	18.5352	(92)	
Temperature adjustment												0.0000		
adjusted MIT	18.5609	18.7938	19.1811	19.7387	20.1678	20.3956	20.4510	20.4420	20.2876	19.7516	19.0894	18.5352	(93)	

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Useful gains	0.9680	0.9546	0.9287	0.8596	0.7355	0.5566	0.4062	0.4612	0.7026	0.8891	0.9512	0.9712	(94)	
Ext temp.	596.6969	646.7529	677.1305	704.0006	653.2705	496.4514	344.3192	356.3992	488.7806	554.0252	567.6199	579.1437	(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	1345.6128	1307.4364	1190.1529	1004.5319	782.9367	529.9434	352.1326	368.8315	568.2206	846.1600	1113.8639	1338.4518	(97)	
Space heating requirement - total per year (kWh/year)	557.1934	443.9793	381.6887	216.3826	96.4716	0.0000	0.0000	0.0000	0.0000	217.3483	393.2957	564.9252	(98a)	
Solar heating kWh												2871.2848		
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	557.1934	443.9793	381.6887	216.3826	96.4716	0.0000	0.0000	0.0000	0.0000	217.3483	393.2957	564.9252	(98c)	
Space heating requirement after solar contribution - total per year (kWh/year)												2871.2848		
Space heating per m2										(98c) / (4) =		33.2286	(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)	557.1934	443.9793	381.6887	216.3826	96.4716	0.0000	0.0000	0.0000	0.0000	217.3483	393.2957	564.9252	(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)	603.6765	481.0177	413.5305	234.4340	104.5196	0.0000	0.0000	0.0000	0.0000	235.4803	426.1058	612.0533	(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	236.1206	208.7770	221.9614	195.8390	190.2370	171.8746	170.0874	176.6720	178.3949	198.3502	210.1555	233.6592	(64)	
Efficiency of water heater (217)m	85.9160	85.7083	85.2641	84.2840	82.6175	79.8000	79.8000	79.8000	79.8000	84.2654	85.4440	85.9633	(216)	
Fuel for water heating, kWh/month	274.8274	243.5901	260.3222	232.3561	230.2624	215.3817	213.1421	221.3934	223.5525	235.3877	245.9569	271.8127	(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	25.5413	20.4902	18.4491	13.5166	10.4406	8.5301	9.5243	12.3800	16.0804	21.0984	23.8306	26.2511	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-11.3736	-17.4773	-27.3498	-33.5621	-38.7324	-37.0925	-36.6390	-33.3043	-27.9207	-21.1579	-13.0041	-9.6722	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity)													
(234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity)													
(235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation)													
(235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233b)m	-2.6843	-5.8635	-12.0761	-18.7835	-25.4928	-25.8652	-25.5655	-21.3431	-15.2515	-8.5929	-3.6476	-2.1072	(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												3110.8178	(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												2867.9852	(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)												206.1327	(232)
Energy saving/generation technologies (Appendices M ,N and Q)													
PV generation												-474.5590	(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												5796.3767	(238)

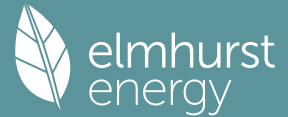
12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3110.8178	0.2100	653.2717	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2867.9852	0.2100	602.2769	(264)
Space and water heating			1255.5486	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	206.1327	0.1443	29.7513	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-307.2858	0.1328	-40.8189	
PV Unit electricity exported	-167.2732	0.1249	-20.8896	
Total			-61.7086	(269)
Total CO2, kg/year			1235.5206	(272)
EPC Target Carbon Dioxide Emission Rate (TER)			14.3000	(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	3110.8178	1.1300	3515.2241	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2867.9852	1.1300	3240.8233	(278)
Space and water heating			6756.0474	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	206.1327	1.5338	316.1732	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-307.2858	1.4908	-458.1148	
PV Unit electricity exported	-167.2732	0.4584	-76.6709	
Total			-534.7856	(283)
Total Primary energy kWh/year			6667.5357	(286)
Target Primary Energy Rate (TPER)			77.1600	(287)

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Plot Reference	A 905				Issued on Date	19/03/2026	
Assessment Reference	Be Green			Plot Type Ref			
Plot Address					SAP Version	10.2	
SAP Rating	82 B	DER	5.02	TER	14.30		
Environmental	96 A	% DER < TER				64.90	
CO ₂ Emissions (t/year)	0.38	DFEE	37.61	TFEE	39.65		
Compliance Check	See BREL	% DFEE < TFEE				5.13	
% DPER < TPER	31.57	DPER	52.80	TPER	77.16		
Assessor Details	Mr. Robert Tanner				Assessor ID	W344-0001	
Client							

SAP 10 WORKSHEET FOR New Build (As Designed) (Version 10.2, February 2022)
CALCULATION OF FABRIC ENERGY EFFICIENCY

1. Overall dwelling characteristics

	Area (m ²)	Storey height (m)	Volume (m ³)
Main dwelling			
Ground floor	86.4100 (1b)	2.8000 (2b)	241.9480 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	86.4100		241.9480 (4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	241.9480 (5)

2. Ventilation rate

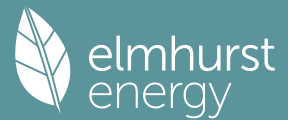
	m ³ per hour
Number of open chimneys	0 * 80 = 0.0000 (6a)
Number of open flues	0 * 20 = 0.0000 (6b)
Number of chimneys / flues attached to closed fire	0 * 10 = 0.0000 (6c)
Number of flues attached to solid fuel boiler	0 * 20 = 0.0000 (6d)
Number of flues attached to other heater	0 * 35 = 0.0000 (6e)
Number of blocked chimneys	0 * 20 = 0.0000 (6f)
Number of intermittent extract fans	3 * 10 = 30.0000 (7a)
Number of passive vents	0 * 10 = 0.0000 (7b)
Number of flueless gas fires	0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	30.0000 / (5) = 0.1240 (8)
Pressure test	Yes
Pressure Test Method	Blower Door
Measured/design AP50	3.0000 (17)
Infiltration rate	0.2740 (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) = 0.2329 (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	0.2969	0.2911	0.2853	0.2562	0.2504	0.2212	0.2212	0.2154	0.2329	0.2504	0.2620	0.2737 (22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000 (23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000 (23c)
Effective ac	0.5441	0.5424	0.5407	0.5328	0.5313	0.5245	0.5245	0.5232	0.5271	0.5313	0.5343	0.5374 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Main dwelling							
Door			2.4200	1.0000	2.4200		(26)
Window			13.4500	1.1450	15.4008		(27)
External Wall 1	54.8800	13.4500	41.4300	0.1500	6.2145	70.0000	2900.1001 (29a)
Corridor wall	40.6600	2.4200	38.2400	0.1900	7.2656	70.0000	2676.8000 (29a)
External Roof 1	86.4100		86.4100	0.1000	8.6410	9.0000	777.6900 (30)
Total net area of external elements A _{um} (A, m ²)			181.9500				(31)
Fabric heat loss, W/K = Sum (A x U)					(26)...(30) + (32) = 39.9419		(33)
Main dwelling							
Party Wall 1			27.8600	0.0000	0.0000	70.0000	1950.2000 (32)
Party Floor 1			86.4100			40.0000	3456.4000 (32a)
Internal Wall 1			197.4300			9.0000	1776.8699 (32c)
Heat capacity C _m = Sum(A x k)						(28)...(30) + (32) + (32a)...(32e) =	13538.0600 (34)
Thermal mass parameter (TMP = C _m / TFA) in kJ/m ² K							156.6724 (35)
List of Thermal Bridges							
K1 Element					Length	Psi-value	Total
E1 Steel lintel with perforated steel base plate					8.4900	0.0500	0.4245
E4 Jamb					21.6000	0.0400	0.8640

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E7 Party floor between dwellings (in blocks of flats)	15.2400	0.0500	0.7620
E7 Party floor between dwellings (in blocks of flats)	14.5200	0.0390	0.5663
E9 Balcony between dwellings, wall insulation continuous	4.3600	0.0500	0.2180
E16 Corner (normal)	5.6000	0.0500	0.2800
E16 Corner (normal)	5.6000	0.0390	0.2184
E17 Corner (inverted - internal area greater than external area)	2.8000	0.0000	0.0000
E18 Party wall between dwellings	2.8000	0.0500	0.1400
E25 Staggered party wall between dwellings	2.8000	0.0390	0.1092
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	9.9500	0.0000	0.0000
E3 Sill	4.9900	0.0400	0.1996
P4 Party wall - Roof (insulation at ceiling level)	9.9500	0.0500	0.4975
Thermal bridges (Sum(L x Psi) calculated using Appendix K)			4.2795 (36)
Point Thermal Bridges			0.0000
Total fabric heat loss		(33) + (36) + (36a) =	44.2213 (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	43.4414	43.3048	43.1708	42.5415	42.4237	41.8756	41.8756	41.7741	42.0868	42.4237	42.6619	42.9109 (38)
Average = Sum(39)m / 12 =	87.6628	87.5261	87.3921	86.7628	86.6451	86.0970	86.0970	85.9955	86.3081	86.6451	86.8833	87.1323 (39)
												86.7623
HLP	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HLP (average)	1.0145	1.0129	1.0114	1.0041	1.0027	0.9964	0.9964	0.9952	0.9988	1.0027	1.0055	1.0084 (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												2.5733 (42)
Hot water usage for mixer showers	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (42a)
Hot water usage for baths	28.4442	28.0149	27.4040	26.4892	25.6648	24.5299	23.6689	24.7218	25.2743	26.3988	27.5680	28.4217 (42b)
Hot water usage for other uses	40.9834	39.4931	38.0028	36.5125	35.0222	33.5319	33.5319	35.0222	36.5125	38.0028	39.4931	40.9834 (42c)
Average daily hot water use (litres/day)												63.6322 (43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy conte	69.4277	67.5080	65.4068	63.0017	60.6870	58.0618	57.2008	59.7440	61.7868	64.4017	67.0611	69.4051 (44)
Energy content (annual)	102.2095	89.3267	93.4650	82.2960	78.2014	67.1465	63.2086	70.3197	71.6696	82.9880	90.6353	101.9265 (45)
Distribution loss (46)m = 0.15 x (45)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (46)
Water storage loss (or HIU loss):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (59)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (61)
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 (62)
Total heat required for water heating calculated for each month	86.8781	75.9277	79.4453	69.9516	66.4712	57.0746	53.7273	59.7718	60.9192	70.5398	77.0400	86.6375 (63a)
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 (63b)
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 (63c)
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 (63d)
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 (64)
Output from w/h	86.8781	75.9277	79.4453	69.9516	66.4712	57.0746	53.7273	59.7718	60.9192	70.5398	77.0400	86.6375 (64)
12Total per year (kWh/year)												844.3840 (64)
Electric shower(s)	53.9489	48.0689	52.4894	50.0900	51.0299	48.6776	50.3002	51.0299	50.0900	52.4894	51.5024	53.9489 (64a)
Heat gains from water heating, kWh/month	35.2067	30.9992	32.9837	30.0104	29.3753	26.4380	26.0069	27.7004	27.7523	30.7573	32.1356	35.1466 (65)
Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m = 613.6656 (64a)												

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

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	122.9244	136.0949	122.9244	127.0219	122.9244	127.0219	122.9244	122.9244	127.0219	122.9244	127.0219	122.9244 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	232.3159	234.7266	228.6517	215.7189	199.3936	184.0501	173.7997	171.3890	177.4639	190.3967	206.7220	222.0655 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330 (71)
Water heating gains (Table 5)	47.3209	46.1297	44.3329	41.6811	39.4829	36.7195	34.9555	37.2318	38.5449	41.3405	44.6328	47.2401 (72)
Total internal gains	464.1611	478.5511	457.5089	446.0218	423.4008	409.3914	393.2795	393.1451	404.6306	416.2615	439.9766	453.8299 (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
Northeast	5.9600	11.2829	0.3500	0.7000	0.7700	11.4174 (75)
Northwest	7.4900	11.2829	0.3500	0.7000	0.7700	14.3484 (81)
Solar gains	25.7658	52.4471	94.4929	155.1845	208.5985	222.3881
Total gains	489.9269	530.9982	552.0019	601.2064	631.9993	631.7795
						208.0395
						165.8515
						115.1411
						64.0945
						32.4201
						21.0417 (83)
						474.8716 (84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	42.8982	42.9652	43.0310	43.3431	43.4020	43.6783	43.6783	43.7299	43.5715	43.4020	43.2830	43.1593
alpha	3.8599	3.8643	3.8687	3.8895	3.8935	3.9119	3.9119	3.9153	3.9048	3.8935	3.8855	3.8773
util living area	0.9902	0.9855	0.9769	0.9477	0.8796	0.7387	0.5873	0.6423	0.8464	0.9577	0.9840	0.9914 (86)
MIT	19.2148	19.3837	19.6713	20.1220	20.5428	20.8455	20.9530	20.9330	20.7151	20.1931	19.6419	19.1859 (87)
Th 2	20.0713	20.0726	20.0739	20.0799	20.0811	20.0864	20.0864	20.0873	20.0843	20.0811	20.0788	20.0764 (88)
util rest of house	0.9881	0.9824	0.9716	0.9345	0.8469	0.6681	0.4821	0.5388	0.7936	0.9446	0.9799	0.9895 (89)
MIT 2	18.4327	18.6014	18.8875	19.3335	19.7317	19.9942	20.0675	20.0582	19.8938	19.4082	18.8635	18.4077 (90)
Living area fraction	fLA = Living area / (4) =											0.4487 (91)
MIT	18.7836	18.9524	19.2392	19.6873	20.0956	20.3762	20.4648	20.4507	20.2623	19.7604	19.2128	18.7568 (92)
Temperature adjustment												0.0000
adjusted MIT	18.7836	18.9524	19.2392	19.6873	20.0956	20.3762	20.4648	20.4507	20.2623	19.7604	19.2128	18.7568 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9843	0.9775	0.9655	0.9278	0.8475	0.6921	0.5275	0.5823	0.8052	0.9389	0.9750	0.9860 (94)
Useful gains	482.2292	519.0494	532.9327	557.7754	535.6134	437.2768	317.2195	325.5052	418.5003	451.0011	460.5759	468.2315 (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	1269.6731	1229.9491	1113.3048	935.9324	727.4391	497.3102	332.7498	348.3428	531.8556	793.7005	1052.3957	1268.3713 (97)
Space heating kWh	585.8583	477.7246	431.7969	272.2731	142.7183	0.0000	0.0000	0.0000	0.0000	254.9683	426.1102	595.3040 (98a)
Space heating requirement - total per year (kWh/year)												3186.7538
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	585.8583	477.7246	431.7969	272.2731	142.7183	0.0000	0.0000	0.0000	0.0000	254.9683	426.1102	595.3040 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3186.7538
Space heating per m2												(98c) / (4) = 36.8795 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000
Heat loss rate W												
	0.0000	0.0000	0.0000	0.0000	0.0000	809.3116	637.1176	653.5656	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.7264	0.8065	0.7657	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	587.8475	513.8151	500.4660	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	686.5905	653.6225	606.4746	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	71.0949	104.0167	78.8704	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction	fc = cooled area / (4) =											
Intermittency factor (Table 10b)												1.0000 (105)
	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh												
	0.0000	0.0000	0.0000	0.0000	0.0000	17.7737	26.0042	19.7176	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												63.4955 (107)
Energy for space heating												36.8795 (99)
Energy for space cooling												0.7348 (108)
Total												37.6143 (109)
Fabric Energy Efficiency (DFEE)												37.6 (109)

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

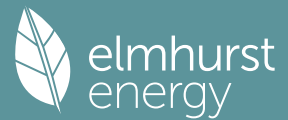
1. Overall dwelling characteristics

Main dwelling	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	86.4100 (1b)	x 2.8000 (2b)	= 241.9480 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	86.4100		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 241.9480 (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)

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Infiltration due to chimneys, flues and fans	= (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =											Air changes per hour	
Pressure test												30.0000 / (5) =	0.1240 (8)
Pressure Test Method												Yes	
Measured/design AP50												Blower Door	
Infiltration rate												5.0000	(17)
Number of sides sheltered												0.3740	(18)
												2	(19)
Shelter factor												(20) = 1 - [0.075 x (19)] =	0.8500 (20)
Infiltration rate adjusted to include shelter factor												(21) = (18) x (20) =	0.3179 (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 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)
	0.4053	0.3974	0.3894	0.3497	0.3417	0.3020	0.3020	0.2941	0.3179	0.3417	0.3576	0.3735	(22b)
If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (N5)), otherwise (23b) = (23a)												0.0000	(23b)
If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =												0.0000	(23c)
Effective ac	0.5821	0.5790	0.5758	0.5611	0.5584	0.5456	0.5456	0.5432	0.5505	0.5584	0.5640	0.5698	(25)

3. Heat losses and heat loss parameter

Element	Gross	Openings	NetArea	U-value	A x U	K-value	A x K	
Main dwelling	m2	m2	m2	W/m2K	W/K	kJ/m2K	kJ/K	
TER Opaque door			2.4200	1.0000	2.4200			(26)
TER Opening Type			13.4500	1.1450	15.4008			(27)
External Wall 1	54.8800	13.4500	41.4300	0.1800	7.4574			(29a)
Corridor wall	40.6600	2.4200	38.2400	0.1800	6.8832			(29a)
External Roof 1	86.4100		86.4100	0.1100	9.5051			(30)
Total net area of external elements Aum(A, m2)			181.9500					(31)
Fabric heat loss, W/K = Sum (A x U)				(26)... (30) + (32) =	41.6665			(33)
Main dwelling								
Party Wall 1			27.8600	0.0000	0.0000			(32)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							156.6724	(35)
List of Thermal Bridges								
K1 Element				Length	Psi-value		Total	
E1 Steel lintel with perforated steel base plate				8.4900	0.0500		0.4245	
E4 Jamb				21.6000	0.0500		1.0800	
E7 Party floor between dwellings (in blocks of flats)				15.2400	0.0700		1.0668	
E7 Party floor between dwellings (in blocks of flats)				14.5200	0.0700		1.0164	
E9 Balcony between dwellings, wall insulation continuous				4.3600	0.0200		0.0872	
E16 Corner (normal)				5.6000	0.0900		0.5040	
E16 Corner (normal)				5.6000	0.0900		0.5040	
E17 Corner (inverted - internal area greater than external area)				2.8000	-0.0900		-0.2520	
E18 Party wall between dwellings				2.8000	0.0600		0.1680	
E25 Staggered party wall between dwellings				2.8000	0.0600		0.1680	
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)				9.9500	0.0000		0.0000	
E3 Sill				4.9900	0.0500		0.2495	
P4 Party wall - Roof (insulation at ceiling level)				9.9500	0.1200		1.1940	
Thermal bridges (Sum(L x Psi) calculated using Appendix K)								6.2104 (36)
Point Thermal bridges							(36a) =	0.0000
Total fabric heat loss						(33) + (36) + (36a) =		47.8769 (37)

4. Water heating energy requirements (kWh/year)

Assumed occupancy												2.5733	(42)
Hot water usage for mixer showers													
Hot water usage for baths	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(42a)
Hot water usage for other uses	29.0928	28.6607	28.0523	26.9304	26.0904	25.1589	24.6558	25.2600	25.9178	26.9145	28.0595	28.9944	(42b)
Average daily hot water use (litres/day)	40.9834	39.4931	38.0028	36.5125	35.0222	33.5319	33.5319	35.0222	36.5125	38.0028	39.4931	40.9834	(42c)
												64.2313	(43)
Daily hot water use	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Energy conte	70.0762	68.1538	66.0551	63.4429	61.1126	58.6908	58.1877	60.2822	62.4303	64.9173	67.5526	69.9779	(44)
Energy content (annual)	110.9836	97.0502	101.5242	86.8502	82.2693	72.1672	70.3730	74.6419	76.9828	88.0922	96.2411	109.5684	(45)
Distribution loss (46)m = 0.15 x (45)m												Total = Sum(45)m =	1066.7440
Water storage loss (or HIU loss):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(46)
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total heat required for water heating calculated for each month	94.3361	82.4926	86.2956	73.8227	69.9289	61.3421	59.8170	63.4456	65.4354	74.8784	81.8049	93.1332	(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	94.3361	82.4926	86.2956	73.8227	69.9289	61.3421	59.8170	63.4456	65.4354	74.8784	81.8049	93.1332	(64)
12Total per year (kWh/year)												Total per year (kWh/year) = Sum(64)m =	906.7324 (64)
Electric shower(s)												907	(64)
	53.9489	48.0689	52.4894	50.0900	51.0299	48.6776	50.3002	51.0299	50.0900	52.4894	51.5024	53.9489	(64a)

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Total Energy used by instantaneous electric shower(s) (kWh/year) = Sum(64a)m =												613.6656 (64a)
Heat gains from water heating, kWh/month	37.0712	32.6404	34.6962	30.9782	30.2397	27.5049	27.5293	28.6189	28.8814	31.8419	33.3268	36.7705 (65)

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

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663	128.6663 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	122.9244	136.0949	122.9244	127.0219	122.9244	127.0219	122.9244	122.9244	127.0219	122.9244	127.0219	122.9244 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	232.3159	234.7266	228.6517	215.7189	199.3936	184.0501	173.7997	171.3890	177.4639	190.3967	206.7220	222.0655 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666	35.8666 (69)
Pumps, fans	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330	-102.9330 (71)
Water heating gains (Table 5)	49.8269	48.5720	46.6347	43.0252	40.6448	38.2013	37.0017	38.4662	40.1130	42.7983	46.2873	49.4227 (72)
Total internal gains	466.6672	480.9934	459.8108	447.3660	424.5627	410.8732	395.3258	394.3796	406.1987	417.7194	441.6311	456.0126 (73)

6. Solar gains

[Jan]				Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c			Access factor Table 6d			Gains W
Northeast				5.9600	11.2829	0.6300	0.7000			0.7700			20.5514 (75)
Northwest				7.4900	11.2829	0.6300	0.7000			0.7700			25.8271 (81)
Solar gains	46.3785	94.4047	170.0873	279.3322	375.4773	400.2985	374.4710	298.5327	207.2540	115.3701	58.3561	37.8750 (83)	
Total gains	513.0456	575.3981	629.8981	726.6981	800.0400	811.1717	769.7968	692.9122	613.4527	533.0894	499.9872	493.8876 (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	Dec
tau	39.8549	39.9628	40.0690	40.5760	40.6722	41.1264	41.1264	41.2117	40.9503	40.6722	40.4779	40.2768
alpha	3.6570	3.6642	3.6713	3.7051	3.7115	3.7418	3.7418	3.7474	3.7300	3.7115	3.6985	3.6851
util living area	0.9888	0.9819	0.9673	0.9189	0.8152	0.6462	0.4996	0.5656	0.8012	0.9468	0.9815	0.9903 (86)
MIT	19.0909	19.3012	19.6551	20.1853	20.6268	20.8900	20.9680	20.9497	20.7440	20.1790	19.5631	19.0654 (87)
Th 2	20.0074	20.0098	20.0122	20.0233	20.0254	20.0351	20.0351	20.0369	20.0314	20.0254	20.0212	20.0168 (88)
util rest of house	0.9864	0.9780	0.9599	0.8999	0.7723	0.5706	0.3995	0.4626	0.7394	0.9305	0.9768	0.9882 (89)
MIT 2	18.2635	18.4736	18.8249	19.3464	19.7524	19.9736	20.0232	20.0165	19.8673	19.3507	18.7433	18.2448 (90)
Living area fraction	18.6347	18.8449	19.1974	19.7228	20.1447	20.3848	20.4471	20.4352	20.2607	19.7223	19.1111	18.6130 (92)
MIT	18.6347	18.8449	19.1974	19.7228	20.1447	20.3848	20.4471	20.4352	20.2607	19.7223	19.1111	18.6130 (93)
Temperature adjustment												0.0000
adjusted MIT	18.6347	18.8449	19.1974	19.7228	20.1447	20.3848	20.4471	20.4352	20.2607	19.7223	19.1111	18.6130 (93)

8. Space heating requirement

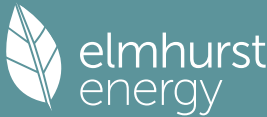
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9819	0.9720	0.9522	0.8931	0.7781	0.5993	0.4434	0.5069	0.7556	0.9243	0.9710	0.9841 (94)
Useful gains	503.7518	559.3003	599.7802	648.9792	622.4806	486.1610	341.3252	351.2298	463.5004	492.7085	485.4852	486.0391 (95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000 (96)
Heat loss rate W	1352.5773	1312.2465	1191.6789	1003.0531	780.8020	528.9546	351.7775	368.2157	565.7509	843.4538	1115.8817	1345.7152 (97)
Space heating kWh	631.5262	505.9798	440.3726	254.9332	117.7911	0.0000	0.0000	0.0000	0.0000	260.9545	453.8855	639.5990 (98a)
Space heating requirement - total per year (kWh/year)												3305.0420
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	631.5262	505.9798	440.3726	254.9332	117.7911	0.0000	0.0000	0.0000	0.0000	260.9545	453.8855	639.5990 (98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3305.0420
Space heating per m ²										(98c) / (4) =		38.2484 (99)

8c. Space cooling requirement

Calculated for June, July and August. See Table 10b

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ext. temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000
Heat loss rate W	0.0000	0.0000	0.0000	0.0000	0.0000	859.5292	676.6506	693.5012	0.0000	0.0000	0.0000	0.0000 (100)
Utilisation	0.0000	0.0000	0.0000	0.0000	0.0000	0.8052	0.8686	0.8252	0.0000	0.0000	0.0000	0.0000 (101)
Useful loss	0.0000	0.0000	0.0000	0.0000	0.0000	692.0863	587.7608	572.2839	0.0000	0.0000	0.0000	0.0000 (102)
Total gains	0.0000	0.0000	0.0000	0.0000	0.0000	896.0195	850.1991	762.7910	0.0000	0.0000	0.0000	0.0000 (103)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	146.8319	195.2542	141.7373	0.0000	0.0000	0.0000	0.0000 (104)
Cooled fraction									fc = cooled area / (4) =			1.0000 (105)
Intermittency factor (Table 10b)	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 (106)
Space cooling kWh	0.0000	0.0000	0.0000	0.0000	0.0000	36.7080	48.8135	35.4343	0.0000	0.0000	0.0000	0.0000 (107)
Space cooling requirement												120.9559 (107)
Energy for space heating												38.2484 (99)
Energy for space cooling												1.3998 (108)

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Total
Fabric Energy Efficiency (TFEE)

39.6482 (109)
39.6 (109)