GREENGAUGE

192 Hawthorn Road

Bognor Regis

Sustainable Energy Note

Rev 1 | March 2025

Audit Sheet

Rev	Date	Description	Author
Rev 0	17/03/2025	Initial issue	MF
Rev 1	17/03/2025	Corrected address	MF

Sustainable Energy Note

Introduction

This document demonstrates that the proposed development at 192 Hawthorn Road meets the renewable energy and water efficiency planning requirements.

The proposed development is for 10 flats, 9 of which are converted from the existing building, and one of which is a new build.

Renewable Energy

The proposed development is required to generate 10% of its energy consumption through renewable sources. This will be achieved through solar PV panels on the roof, which will generate electricity to provide 10% of the energy demand.

To demonstrate this, SAP calculations have been carried out on a sample of dwellings to predict the total regulated energy use of the development.

Type representation	New build	Ground/top floor	Mid floor
Modelled flat	4	10	6
Total energy (kWh/a)	4439	8830	6488
Area of flat (m2)	38.44	58.48	54.35
Total area for type (m2)	38.44	224.48	182.35
Total energy for type (kWh/a)	4439	33894	21769
Total energy for site (kWh/a)	60103		
PV generation required (kWh/a)	6010		

The modelling shows that 6010 kWh/a of solar PV generation is required to meet 10% of the regulated energy demand. Based on SAP this will require approx. 9.88 kWp of solar PV, based on panels installed with a pitch <15°, with moderate shading. This could be achieved with 25 400 W panels.

In the sample SAP assessments, the flats have been modelled with the proportional amount of PV they would need to meet 10% of the energy demand through renewable energy. The SAP worksheets are shown in the appendix.

Water Use Efficiency

The proposed dwellings will meet a water efficiency target of 110l/p/d (litres/person/day). This will be achieved by following the maximum fittings consumptions values for 110 l/p/d from Part G Building Regulations (below).

Table 2.2 Maximum fittings consumption optional requirement level

Water fitting	Maximum consumption
WC	4/2.6 litres dual flush
Shower	8 l/min
Bath	170 litres
Basin taps	5 l/min
Sink taps	6 l/min
Dishwasher	1.25 l/place setting
Washing machine	8.17 l/kilogram

GREENGAUGE

The Old Brewery,
Newtown, Bradford-on-Avon, Wiltshire,
BA15 1NF

[redacted]
w: www.ggbec.co.uk
[redacted]

Summary for Input Data

elmhurst energy

Property Reference	Flat 4	Issued on Date	17/03/2025
Assessment Reference	Proposed	Prop Type Ref	Flat 4
Property	Flat 4, 192 Hawthorn Road, Bognor Regis, PO21 2UX		

SAP Rating	81 B	DER	22.44	TER	19.49
Environmental	87 B	% DER < TER			-15.14
CO2 Emissions (t/year)	0.74	DFEE	50.67	TFEE	52.85
Compliance Check	See BREL	% DFEE < TFEE			4.12
% DPER < TPER	-16.11	DPER	120.74	TPER	103.99

Assessor Details	Mr. Mitchell Finn	Assessor ID	AX89-0001
Client			

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

Orientation	West	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, End-Terrace	
Position of Flat	Ground-floor flat	
Which Floor	0	
2.0 Number of Storeys	1	
3.0 Date Built	2025	
3.0 Property Age Band	L	
4.0 Sheltered Sides	1	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	316.75	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	18.06 m	38.44 m²	2.40 m

8.0 Living Area	21.41	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
External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18	150.00	43.34	35.83	0.00	None	7.51	Calculate Wall Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	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	27.10	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall	Plasterboard on timber frame	9.00	36.62

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
Roof	External Flat Roof	Plasterboard, insulated flat roof	0.11	9.00	38.44	38.44	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)

Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Slab on ground, screed over insulation	0.13	None	0.00	110.00	38.44

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Opaque door	Manufacturer	Solid Door	Triple Low-E Soft 0.05			0.00			1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
W Window	Window	External Wall	West	1.42	0
N Window	Window	External Wall	North	2.76	0
Door	Opaque door	External Wall	West	1.89	0
E Window	Window	External Wall	East	1.44	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
E2 Other lintels (including other steel lintels)	Independently assessed	6.81	0.05	0.05	No
E3 Sill	Independently assessed	5.91	0.05	0.05	No
E4 Jamb	Independently assessed	11.80	0.05	0.05	No
E5 Ground floor (normal)	Independently assessed	18.06	0.16	0.16	No
E14 Flat roof	Independently assessed	18.06	0.08	0.08	No
E16 Corner (normal)	Independently assessed	4.80	0.09	0.09	No
E18 Party wall between dwellings	Independently assessed	4.80	0.06	0.06	No
P1 Party wall - Ground floor	Independently assessed	11.29	0.08	0.08	No
E24 Eaves (insulation at ceiling level - inverted)	Independently assessed	11.29	0.08	0.08	No

Y-value	0.07	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No	

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	2	
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}	5.00	m³/(h.m²) @ 50 Pa
Property Tested?	Yes	
Test Method	Blower Door	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	89.00	6675.00	1

24.0 Main Heating 1	Manufacturer	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	89.90	

In Summer	80.30
Model Name	Gas boiler
Manufacturer	Gas boiler
Controls SAP Code	2106
Delayed Start Stat	No
Burner Control	Modulating
HETAS approved System	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	Yes

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
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
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
Shower	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None
Cylinder Stat	No
Cylinder In Heated Space	No
Independent Time Control	No
In Airing Cupboard	No

31.0 Thermal Store	None

32.0 Photovoltaic Unit	Multiple Dwellings – Not Connected
Export Capable Meter?	Yes
Connected To Dwelling	No
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer

Summary for Input Data

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0.73	South	Horizontal	Modest	No	No	0.80	Solar

34.0 Small-scale Hydro	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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

elmhurst energy

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% DPER < TPER	-16.11	DPER	120.74	TPER	103.99

Assessor Details	Mr. Mitchell Finn	Assessor ID	AX89-0001
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 (m2)		Storey height (m)		Volume (m3)	
Main dwelling							
Ground floor		38.4400 (1b)	x	2.4000 (2b)	=	92.2560	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	38.4400						(4)
Dwelling volume				(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	92.2560	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.2168	(8)
Pressure test		Yes	
Pressure Test Method		Blower Door	
Measured/design AP50		5.0000	(17)
Infiltration rate		0.4668	(18)
Number of sides sheltered		1	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.9250	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.4318	(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	0.5505	0.5397	0.5289	0.4750	0.4642	0.4102	0.4102	0.3994	0.4318	0.4642	0.4858	0.5073	(22b)
Effective ac	0.6515	0.6457	0.6399	0.6128	0.6077	0.5841	0.5841	0.5798	0.5932	0.6077	0.6180	0.6287	(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								
Window			5.6200	1.1450	6.4351			(27)
Opaque door			1.8900	1.2000	2.2680			(26)
Heatloss Floor 1			38.4400	0.1300	4.9972	110.0000	4228.4000	(28a)
External Wall	43.3440	7.5100	35.8340	0.1800	6.4501	150.0000	5375.1000	(29a)
Roof	38.4400		38.4400	0.1100	4.2284	9.0000	345.9600	(30)
Total net area of external elements Aum(A, m2)			120.2240					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		24.3788			(33)
Main dwelling								
Party Wall 1			27.1000	0.0000	0.0000	70.0000	1897.0000	(32)
Internal Wall			36.6200			9.0000	329.5800	(32c)

Heat capacity Cm = Sum(A x k) (28)...(30) + (32) + (32a)...(32e) = 12176.0400 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K 316.7544 (35)

List of Thermal Bridges

K1 Element	Length	Psi-value	Total
E2 Other lintels (including other steel lintels)	6.8100	0.0500	0.3405
E3 Sill	5.9100	0.0500	0.2955
E4 Jamb	11.8000	0.0500	0.5900
E5 Ground floor (normal)	18.0600	0.1600	2.8896
E14 Flat roof	18.0600	0.0800	1.4448

E16 Corner (normal)	4.8000	0.0900	0.4320
E18 Party wall between dwellings	4.8000	0.0600	0.2880
P1 Party wall - Ground floor	11.2900	0.0800	0.9032
E24 Eaves (insulation at ceiling level - inverted)	11.2900	0.0800	0.9032

Thermal bridges (Sum(L x Psi) calculated using Appendix K)		8.0868	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	32.4656	(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	19.8356	19.6565	19.4809	18.6561	18.5018	17.7835	17.7835	17.6504	18.0602	18.5018	18.8140	19.1404	(38)
Heat transfer coeff	52.3013	52.1221	51.9465	51.1218	50.9675	50.2491	50.2491	50.1161	50.5258	50.9675	51.2796	51.6060	(39)
Average = Sum(39)m / 12 =												51.1210	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.3606	1.3559	1.3514	1.3299	1.3259	1.3072	1.3072	1.3037	1.3144	1.3259	1.3340	1.3425	(40)
HLP (average)												1.3299	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Assumed occupancy												1.3655	(42)
Hot water usage for mixer showers	60.4358	59.5275	58.2040	55.6718	53.8031	51.7191	50.5346	51.8481	53.2878	55.5254	58.1120	60.2042	(42a)
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	(42b)
Hot water usage for other uses	28.6143	27.5738	26.5332	25.4927	24.4522	23.4117	23.4117	24.4522	25.4927	26.5332	27.5738	28.6143	(42c)
Average daily hot water use (litres/day)												81.7327	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	89.0500	87.1013	84.7373	81.1645	78.2553	75.1308	73.9463	76.3003	78.7806	82.0586	85.6858	88.8185	(44)
Energy conte	141.0335	124.0311	130.2381	111.1102	105.3467	92.3821	89.4316	94.4757	97.1443	111.3528	122.0751	139.0683	(45)
Energy content (annual)										Total = Sum(45)m =		1357.6894	
Distribution loss (46)m = 0.15 x (45)m	21.1550	18.6047	19.5357	16.6665	15.8020	13.8573	13.4147	14.1713	14.5716	16.7029	18.3113	20.8602	(46)
Water storage loss: Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	191.9924	170.0585	181.1970	160.4253	156.3056	141.6972	140.3905	145.4346	146.4594	162.3117	171.3902	190.0272	(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	191.9924	170.0585	181.1970	160.4253	156.3056	141.6972	140.3905	145.4346	146.4594	162.3117	171.3902	190.0272	(64)
									Total per year (kWh/year) = Sum(64)m =			1957.6894	(64)
12Total per year (kWh/year)												1958	(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	59.6334	52.7472	56.0439	49.2729	47.7675	43.0458	42.4757	44.1529	44.6293	49.7645	52.9187	58.9799	(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	68.2759	68.2759	68.2759	68.2759	68.2759	68.2759	68.2759	68.2759	68.2759	68.2759	68.2759	68.2759	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	63.0599	69.8163	63.0599	65.1619	63.0599	65.1619	63.0599	63.0599	65.1619	63.0599	65.1619	63.0599	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	117.6310	118.8516	115.7756	109.2272	100.9611	93.1920	88.0019	86.7812	89.8572	96.4056	104.6718	112.4408	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	29.8276	29.8276	29.8276	29.8276	29.8276	29.8276	29.8276	29.8276	29.8276	29.8276	29.8276	29.8276	(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)	-54.6208	-54.6208	-54.6208	-54.6208	-54.6208	-54.6208	-54.6208	-54.6208	-54.6208	-54.6208	-54.6208	-54.6208	(71)
Water heating gains (Table 5)	80.1524	78.4928	75.3278	68.4346	64.2036	59.7859	57.0910	59.3453	61.9851	66.8878	73.4982	79.2741	(72)
Total internal gains	307.3260	313.6435	300.6461	289.3065	274.7074	261.6225	251.6355	252.6691	260.4869	272.8360	289.8146	301.2575	(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	2.7600	10.6334	0.6300	0.7000	0.7700	8.9692	(74)
East	1.4400	19.6403	0.6300	0.7000	0.7700	8.6433	(76)
West	1.4200	19.6403	0.6300	0.7000	0.7700	8.5233	(80)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	26.1358	50.7221	84.4301	127.4415	161.8711	168.6566	159.3257	132.7255	99.3398	60.2510	32.4694	21.5942	(83)
Total gains	333.4618	364.3656	385.0762	416.7480	436.5785	430.2792	410.9613	385.3947	359.8267	333.0870	322.2841	322.8517	(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	64.6683	64.8905	65.1099	66.1603	66.3606	67.3093	67.3093	67.4880	66.9407	66.3606	65.9567	65.5395	
alpha	5.3112	5.3260	5.3407	5.4107	5.4240	5.4873	5.4873	5.4992	5.4627	5.4240	5.3971	5.3693	
util living area	0.9963	0.9933	0.9862	0.9582	0.8769	0.7024	0.5296	0.5834	0.8316	0.9685	0.9924	0.9969	(86)
MIT	19.7920	19.9341	20.1654	20.5084	20.7955	20.9564	20.9922	20.9872	20.8890	20.5346	20.1195	19.7801	(87)
Th 2	19.7937	19.7973	19.8008	19.8175	19.8206	19.8352	19.8352	19.8379	19.8296	19.8206	19.8143	19.8077	(88)
util rest of house	0.9947	0.9905	0.9800	0.9384	0.8209	0.5947	0.3941	0.4441	0.7410	0.9494	0.9886	0.9956	(89)
MIT 2	18.7254	18.8691	19.1000	19.4429	19.6961	19.8191	19.8338	19.8353	19.7782	19.4758	19.0673	18.7245	(90)
Living area fraction									fLA = Living area / (4) =			0.5570	(91)
MIT	19.3195	19.4623	19.6934	20.0364	20.3084	20.4525	20.4790	20.4769	20.3969	20.0655	19.6534	19.3124	(92)
Temperature adjustment												0.0000	
adjusted MIT	19.3195	19.4623	19.6934	20.0364	20.3084	20.4525	20.4790	20.4769	20.3969	20.0655	19.6534	19.3124	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9939	0.9895	0.9793	0.9427	0.8464	0.6542	0.4701	0.5224	0.7889	0.9543	0.9879	0.9948	(94)
Useful gains	331.4265	360.5266	377.1071	392.8634	369.5294	281.4848	193.1932	201.3404	283.8703	317.8505	318.3916	321.1848	(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	785.5383	759.0173	685.3508	569.3119	438.7498	294.0853	194.9168	204.3173	318.1556	482.4336	643.7325	779.8916	(97)
Space heating kWh	337.8591	267.7857	229.3333	127.0429	51.4999	0.0000	0.0000	0.0000	0.0000	122.4498	234.2454	341.2778	(98a)
Space heating requirement - total per year (kWh/year)												1711.4941	
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	337.8591	267.7857	229.3333	127.0429	51.4999	0.0000	0.0000	0.0000	0.0000	122.4498	234.2454	341.2778	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												1711.4941	
Space heating per m2											(98c) / (4) =	44.5238	(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 %)	89.9000	(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	337.8591	267.7857	229.3333	127.0429	51.4999	0.0000	0.0000	0.0000	0.0000	122.4498	234.2454	341.2778	(98)
Space heating efficiency (main heating system 1)	89.9000	89.9000	89.9000	89.9000	89.9000	0.0000	0.0000	0.0000	0.0000	89.9000	89.9000	89.9000	(210)
Space heating fuel (main heating system)	375.8166	297.8707	255.0983	141.3158	57.2858	0.0000	0.0000	0.0000	0.0000	136.2067	260.5622	379.6194	(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	191.9924	170.0585	181.1970	160.4253	156.3056	141.6972	140.3905	145.4346	146.4594	162.3117	171.3902	190.0272	(64)
Efficiency of water heater												80.3000	(216)
(217)m	86.1673	85.9108	85.3940	84.2772	82.4829	80.3000	80.3000	80.3000	80.3000	84.1647	85.5772	86.2136	(217)
Fuel for water heating, kWh/month	222.8136	197.9476	212.1893	190.3542	189.5007	176.4597	174.8325	181.1140	182.3903	192.8500	200.2755	220.4144	(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	13.4061	10.7549	9.6836	7.0946	5.4801	4.4773	4.9991	6.4980	8.4403	11.0741	12.5082	13.7787	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-7.1639	-12.0978	-21.0510	-27.7714	-33.0054	-31.9328	-31.3525	-27.8558	-22.0770	-15.2645	-8.4299	-5.9057	(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	-1.8693	-4.8476	-12.3020	-22.6616	-33.7007	-35.3112	-34.3113	-26.6903	-16.5883	-7.6657	-2.6653	-1.3903	(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	1903.7754	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	80.3000	
Water heating fuel used	2341.1419	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	41.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	108.1950	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-443.9113	(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	3995.2011	(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	1903.7754	0.2100	399.7928	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2341.1419	0.2100	491.6398	(264)
Space and water heating			891.4326	(265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293	(267)
Energy for lighting	108.1950	0.1443	15.6159	(268)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-243.9078	0.1316	-32.0890	
PV Unit electricity exported	-200.0035	0.1212	-24.2436	
Total			-56.3326	(269)
Total CO2, kg/year			862.6452	(272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			22.4400	(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	1903.7754	1.1300	2151.2662	(275)
Total CO2 associated with community systems			0.0000	(473)
Water heating (other fuel)	2341.1419	1.1300	2645.4904	(278)
Space and water heating			4796.7566	(279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008	(281)
Energy for lighting	108.1950	1.5338	165.9531	(282)
Energy saving/generation technologies				
PV Unit electricity used in dwelling	-243.9078	1.4861	-362.4620	
PV Unit electricity exported	-200.0035	0.4447	-88.9443	
Total			-451.4064	(283)
Total Primary energy kWh/year			4641.4041	(286)
Dwelling Primary energy Rate (DPER)			120.7400	(287)

Summary for Input Data

elmhurst energy

Property Reference	Flat 10	Issued on Date	17/03/2025
Assessment Reference	Proposed	Prop Type Ref	Flat 10
Property	Flat 10, 192 Hawthorn Road, Bognor Regis, PO21 2UX		

SAP Rating	75 C	DER	29.48	TER	
Environmental	78 C	% DER < TER			N/A
CO_2 Emissions (t/year)	1.55	DFEE	93.88	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	158.05	TPER	

Assessor Details	Mr. Mitchell Finn	Assessor ID	AX89-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	Southeast	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Detached	
Position of Flat	Ground-floor flat	
Which Floor	0	
2.0 Number of Storeys	1	
3.0 Date Built	2025	
3.0 Property Age Band	L	
4.0 Sheltered Sides	0	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	49.24	kJ/m²K

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

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	31.50 m	58.48 m²	2.50 m

8.0 Living Area 41.37 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
External Wall	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure	0.36	9.00	78.75	73.50	0.00	None	5.25	Calculate Wall Area

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall	Plasterboard on timber frame	9.00	58.00

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
Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.12	9.00	58.48	58.48	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)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Suspended timber, insulation between joists	0.25	None	0.00	20.00	58.48

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)

Window	Manufacturer	Window	Double Low-E Soft 0.05	0.63	0.70	1.40
Opaque door	Manufacturer	Solid Door		0.00		1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
E Window	Window	External Wall	South East	0.96	0
S Window	Window	External Wall	South West	2.40	0
Door	Opaque door	External Wall	South East	1.89	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
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	2	
Number of passive vents	0	
Number of flueless gas fires	0	
21.0 Fixed Cooling System	No	
22.0 Pressure Testing	No	
Property Tested?	Yes	
Test Method	Blower Door	
22.0 Lighting		
No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	136.00	10200.00	1

24.0 Main Heating 1	Manufacturer	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	89.90	
In Summer	80.30	
Model Name	Gas boiler	
Manufacturer	Gas boiler	
Controls SAP Code	2106	
Delayed Start Stat	No	
Burner Control	Modulating	
HETAS approved System	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators	

Flow Temperature	Unknown
Boiler Interlock	Yes

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
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
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
Shower	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	None
Cylinder Stat	No
Cylinder In Heated Space	No
Independent Time Control	No
In Airing Cupboard	No

31.0 Thermal Store	None

32.0 Photovoltaic Unit	Multiple Dwellings – Not Connected
Export Capable Meter?	Yes
Connected To Dwelling	No
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
1.45	South	Horizontal	Modest	No	No	0.80		Solar

34.0 Small-scale Hydro	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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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Property Reference	Flat 10	Issued on Date	17/03/2025
Assessment Reference	Proposed	Prop Type Ref	Flat 10
Property	Flat 10, 192 Hawthorn Road, Bognor Regis, PO21 2UX		

SAP Rating	75 C	DER	29.48	TER	
Environmental	78 C	% DER < TER			N/A
CO_2 Emissions (t/year)	1.55	DFEE	93.88	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	158.05	TPER	

Assessor Details	Mr. Mitchell Finn	Assessor ID	AX89-0001
Client			

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

1. Overall dwelling characteristics

	Area (m2)		Storey height (m)		Volume (m3)	
Main dwelling						
Ground floor	58.4800 (1b)	x	2.5000 (2b)	=	146.2000	(1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n) 58.4800						(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	146.2000	(5)

2. Ventilation rate

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

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =	20.0000 / (5) =	0.1368	(8)
Pressure test		No	
Pressure Test Method		Blower Door	
Measured/design AP50		15.0000	(17)
Infiltration rate		0.8868	(18)
Number of sides sheltered		0	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	1.0000	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.8868	(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	1.1307	1.1085	1.0863	0.9755	0.9533	0.8425	0.8425	0.8203	0.8868	0.9533	0.9976	1.0420	(22b)
Effective ac	1.1307	1.1085	1.0863	0.9758	0.9544	0.8549	0.8549	0.8364	0.8932	0.9544	0.9977	1.0420	(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								
Window			3.3600	1.3258	4.4545			(27)
Opaque door			1.8900	1.4000	2.6460			(26)
Heatloss Floor 1			58.4800	0.2500	14.6200	20.0000	1169.6000	(28a)
External Wall	78.7500	5.2500	73.5000	0.3600	26.4600	9.0000	661.5000	(29a)
Roof	58.4800		58.4800	0.1200	7.0176	9.0000	526.3200	(30)
Total net area of external elements Aum(A, m2)			195.7100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		55.1981			(33)
Main dwelling								
Internal Wall			58.0000			9.0000	522.0000	(32c)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	2879.4200	(34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		49.2377	(35)
Thermal bridges (Default value 0.200 * total exposed area)		39.1420	(36)
Point Thermal bridges	(36a) =	0.0000	
Total fabric heat loss	(33) + (36) + (36a) =	94.3401	(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	54.5502	53.4806	52.4110	47.0775	46.0459	41.2440	41.2440	40.3547	43.0936	46.0459	48.1327	50.2718	(38)

Heat transfer coeff

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	148.8904	147.8208	146.7512	141.4176	140.3861	135.5841	135.5841	134.6949	137.4338	140.3861	142.4728	144.6119	(39)
Average = Sum(39)m / 12 =												141.3361	
HLP	2.5460	2.5277	2.5094	2.4182	2.4006	2.3185	2.3185	2.3033	2.3501	2.4006	2.4363	2.4728	(40)
HLP (average)												2.4168	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Assumed occupancy												1.9383	(42)
Hot water usage for mixer showers	72.8150	71.7208	70.1262	67.0753	64.8238	62.3130	60.8858	62.4683	64.2030	66.8989	70.0153	72.5361	(42a)
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	(42b)
Hot water usage for other uses	34.4806	33.2268	31.9729	30.7191	29.4653	28.2114	28.2114	29.4653	30.7191	31.9729	33.2268	34.4806	(42c)
Average daily hot water use (litres/day)												98.4790	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	107.2957	104.9475	102.0991	97.7944	94.2891	90.5244	89.0972	91.9335	94.9221	98.8718	103.2421	107.0167	(44)
Energy conte	169.9301	149.4439	156.9226	133.8756	126.9312	111.3103	107.7553	113.8329	117.0484	134.1681	147.0873	167.5622	(45)
Energy content (annual)											Total = Sum(45)m =	1635.8680	
Distribution loss (46)m = 0.15 x (45)m	25.4895	22.4166	23.5384	20.0813	19.0397	16.6965	16.1633	17.0749	17.5573	20.1252	22.0631	25.1343	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	220.8890	195.4713	207.8815	183.1907	177.8901	160.6253	158.7142	164.7918	166.3635	185.1270	196.4024	218.5211	(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	220.8890	195.4713	207.8815	183.1907	177.8901	160.6253	158.7142	164.7918	166.3635	185.1270	196.4024	218.5211	(64)
								Total per year (kWh/year) = Sum(64)m =				2235.8680	(64)
12Total per year (kWh/year)												2236	(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	69.2415	61.1969	64.9165	56.8424	54.9443	49.3394	48.5684	50.5892	51.2474	57.3506	61.2353	68.4542	(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	96.9174	96.9174	96.9174	96.9174	96.9174	96.9174	96.9174	96.9174	96.9174	96.9174	96.9174	96.9174	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	108.7674	120.4210	108.7674	112.3930	108.7674	112.3930	108.7674	108.7674	112.3930	108.7674	112.3930	108.7674	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	169.0978	170.8525	166.4307	157.0172	145.1344	133.9662	126.5051	124.7504	129.1722	138.5857	150.4686	161.6368	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.6917	32.6917	32.6917	32.6917	32.6917	32.6917	32.6917	32.6917	32.6917	32.6917	32.6917	32.6917	(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)	-77.5339	-77.5339	-77.5339	-77.5339	-77.5339	-77.5339	-77.5339	-77.5339	-77.5339	-77.5339	-77.5339	-77.5339	(71)
Water heating gains (Table 5)	93.0665	91.0669	87.2533	78.9478	73.8499	68.5270	65.2801	67.9962	71.1769	77.0842	85.0490	92.0083	(72)
Total internal gains	426.0069	437.4157	417.5267	403.4332	382.8269	366.9613	352.6278	353.5892	364.8173	379.5125	402.9858	417.4877	(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	0.9600	36.7938	0.6300	0.7000	0.7700	10.7949	(77)
Southwest	2.4000	36.7938	0.6300	0.7000	0.7700	26.9872	(79)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	37.7821	64.3569	88.0559	109.1055	122.2073	121.3236	116.9689	107.1944	95.3459	71.1281	45.2543	32.3336	(83)
Total gains	463.7890	501.7726	505.5826	512.5387	505.0342	488.2849	469.5967	460.7836	460.1632	450.6406	448.2400	449.8213	(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	5.3720	5.4109	5.4503	5.6559	5.6974	5.8992	5.8992	5.9382	5.8198	5.6974	5.6140	5.5309	
alpha	1.3581	1.3607	1.3634	1.3771	1.3798	1.3933	1.3933	1.3959	1.3880	1.3798	1.3743	1.3687	
util living area	0.9152	0.9026	0.8888	0.8588	0.8154	0.7374	0.6503	0.6664	0.7705	0.8546	0.8965	0.9175	(86)
MIT	15.4275	15.7599	16.4070	17.4102	18.4598	19.5139	20.1476	20.0800	19.2818	17.9451	16.5699	15.4115	(87)
Th 2	18.9942	19.0047	19.0153	19.0691	19.0797	19.1295	19.1295	19.1388	19.1101	19.0797	19.0583	19.0367	(88)
util rest of house	0.9016	0.8868	0.8689	0.8299	0.7678	0.6475	0.4899	0.5173	0.6932	0.8194	0.8772	0.9045	(89)
MIT 2	14.2117	14.5450	15.1918	16.2087	17.2374	18.2573	18.7989	18.7545	18.0407	16.7459	15.3803	14.2188	(90)
Living area fraction									fLA = Living area / (4) =			0.7074	(91)
MIT	15.0718	15.4045	16.0515	17.0587	18.1021	19.1463	19.7530	19.6922	18.9187	17.5942	16.2218	15.0625	(92)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Temperature adjustment												0.0000	
adjusted MIT	15.0718	15.4045	16.0515	17.0587	18.1021	19.1463	19.7530	19.6922	18.9187	17.5942	16.2218	15.0625	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.8607	0.8436	0.8251	0.7873	0.7350	0.6485	0.5547	0.5714	0.6830	0.7809	0.8351	0.8641	(94)
Useful gains	399.1923	423.3033	417.1530	403.5073	371.2101	316.6699	260.4776	263.2983	314.2968	351.9264	374.3410	388.6948	(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	1603.8105	1552.7761	1401.6900	1153.7835	898.7707	616.4028	427.4982	443.4410	662.2521	981.8914	1299.6125	1570.8529	(97)
Space heating kWh	896.2360	759.0058	732.4955	540.1988	392.5051	0.0000	0.0000	0.0000	0.0000	468.6940	666.1955	879.5256	(98a)
Space heating requirement - total per year (kWh/year)												5334.8563	
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	896.2360	759.0058	732.4955	540.1988	392.5051	0.0000	0.0000	0.0000	0.0000	468.6940	666.1955	879.5256	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												5334.8563	
Space heating per m2											(98c) / (4) =	91.2253	(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 %)	89.9000	(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	896.2360	759.0058	732.4955	540.1988	392.5051	0.0000	0.0000	0.0000	0.0000	468.6940	666.1955	879.5256	(98)
Space heating efficiency (main heating system 1)	89.9000	89.9000	89.9000	89.9000	89.9000	0.0000	0.0000	0.0000	0.0000	89.9000	89.9000	89.9000	(210)
Space heating fuel (main heating system)	996.9254	844.2778	814.7893	600.8886	436.6019	0.0000	0.0000	0.0000	0.0000	521.3504	741.0406	978.3377	(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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Water heating requirement	220.8890	195.4713	207.8815	183.1907	177.8901	160.6253	158.7142	164.7918	166.3635	185.1270	196.4024	218.5211	(64)
Efficiency of water heater												80.3000	(216)
(217)m	87.8239	87.7515	87.5853	87.2582	86.6686	80.3000	80.3000	80.3000	80.3000	86.9565	87.5177	87.8108	(217)
Fuel for water heating, kWh/month	251.5134	222.7554	237.3475	209.9409	205.2533	200.0316	197.6516	205.2202	207.1775	212.8962	224.4144	248.8545	(219)
Space cooling fuel requirement (221)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(221)
Pumps and Fa	7.3041	6.5973	7.3041	7.0685	7.3041	7.0685	7.3041	7.3041	7.0685	7.3041	7.0685	7.3041	(231)
Lighting	23.1232	18.5503	16.7025	12.2370	9.4522	7.7225	8.6226	11.2080	14.5581	19.1010	21.5745	23.7659	(232)
Electricity generated by PVs (Appendix M) (negative quantity) (233a)m	-13.6289	-22.5468	-38.2712	-49.0747	-56.9737	-54.5703	-53.6119	-48.3430	-39.2612	-28.0310	-15.8992	-11.2793	(233a)
Electricity generated by wind turbines (Appendix M) (negative quantity) (234a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(234a)
Electricity generated by hydro-electric generators (Appendix M) (negative quantity) (235a)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235a)
Electricity used or net electricity generated by micro-CHP (Appendix N) (negative if net generation) (235c)m	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(235c)
Electricity generated by PVs (Appendix M) (negative quantity) (233b)m	-4.3389	-11.1596	-28.0717	-51.2421	-75.7120	-79.1855	-77.0006	-60.1552	-37.6483	-17.5797	-6.1705	-3.2332	(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	5934.2117	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	80.3000	
Water heating fuel used	2623.0564	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	41.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	186.6177	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-882.9886	(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	7946.8972	(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	5934.2117	0.2100	1246.1845	(261)
Total CO2 associated with community systems			0.0000	(373)
Water heating (other fuel)	2623.0564	0.2100	550.8418	(264)

Space and water heating			1797.0263 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	186.6177	0.1443	26.9347 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-431.4913	0.1320	-56.9779
PV Unit electricity exported	-451.4973	0.1214	-54.8094
Total			-111.7873 (269)
Total CO2, kg/year			1724.1030 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			29.4800 (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	5934.2117	1.1300	6705.6592 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2623.0564	1.1300	2964.0537 (278)
Space and water heating			9669.7130 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	186.6177	1.5338	286.2405 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-431.4913	1.4879	-642.0124
PV Unit electricity exported	-451.4973	0.4454	-201.0886
Total			-843.1010 (283)
Total Primary energy kWh/year			9242.9533 (286)
Dwelling Primary energy Rate (DPER)			158.0500 (287)

Summary for Input Data

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Property Reference	Flat 6	Issued on Date	17/03/2025
Assessment Reference	Proposed	Prop Type Ref	Flat 6
Property	Flat 6, 192 Hawthorn Road, Bognor Regis, PO21 2UX		

SAP Rating	79 C	DER	23.08	TER	
Environmental	84 B	% DER < TER			N/A
CO2 Emissions (t/year)	1.08	DFEE	65.40	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	123.39	TPER	

Assessor Details	Mr. Mitchell Finn	Assessor ID	AX89-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	East	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Flat, Mid-Terrace	
Position of Flat	Mid-floor flat	
Which Floor	1	
2.0 Number of Storeys	1	
3.0 Date Built	2025	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	181.58	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	No	
Smart gas meter fitted	No	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	19.17 m	54.35 m²	2.50 m

8.0 Living Area	14.65	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
External Wall	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure	0.36	9.00	43.20	32.66	0.00	None	10.54	Enter Gross Area
Wall to corridor	Solid Wall	Solid wall : plasterboard on dabs, insulation, any outside structure	0.71	9.00	6.45	6.45	2.50	Stairwell Stairwell 2	0.00	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall	Solid Wall	Single plasterboard on both sides, dense cellular blocks, cavity	0.00	70.00	35.48	0.00	None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall Stud	Plasterboard on timber frame	9.00	38.05
Internal Wall Brick	Dense block, plasterboard on dabs	75.00	59.00

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
Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.12	9.00	47.40	47.40	None	0.00	Enter Gross Area	0.00

Summary for Input Data

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10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Timber I-joists, carpeted	20.00	6.95

11.1 Party Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Party Floor 1	Lowest occupied	Timber I-joists, carpeted	20.00	54.35

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40
Door to stairwell	Manufacturer	Solid Door				0.00			0.35

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
N Window	Window	External Wall	North	3.91	0
W Window	Window	External Wall	West	4.94	0
Door	Door to stairwell	External Wall	East	1.68	0

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	
Y-value	0.20	W/m²K

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No

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	2
Number of passive vents	0
Number of flueless gas fires	0

21.0 Fixed Cooling System	No
22.0 Pressure Testing	No
Property Tested?	Yes
Test Method	Blower Door

22.0 Lighting

No Fixed Lighting	No

Name	Efficacy	Power	Capacity	Count
Lighting 1	75.00	126.00	9450.00	1

24.0 Main Heating 1	Manufacturer	
Percentage of Heat	100.00	%
Database Ref. No.	0	
Fuel Type	Mains gas	
SAP Code	104	
In Winter	89.90	
In Summer	80.30	
Model Name	Gas boiler	

Manufacturer	Gas boiler
Controls SAP Code	2106
Delayed Start Stat	No
Burner Control	Modulating
HETAS approved System	No
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators
Flow Temperature	Unknown
Boiler Interlock	Yes

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
Summer Immersion	No
Cold Water Source	From mains
Bath Count	0
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
Shower	Combi boiler or unvented hot water system	8.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder None

Cylinder Stat	No
Cylinder In Heated Space	No
Independent Time Control	No
In Airing Cupboard	No

31.0 Thermal Store None

32.0 Photovoltaic Unit Multiple Dwellings – Not Connected

Export Capable Meter?	Yes
Connected To Dwelling	No
Diverter	No
Battery Capacity [kWh]	0.00

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
1.07	West	45°	None Or Little	No	No	1.00		Solar

34.0 Small-scale Hydro None

Summary for Input Data

elmhurst energy

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

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

elmhurst energy

Property Reference	Flat 6	Issued on Date	17/03/2025
Assessment Reference	Proposed	Prop Type Ref	Flat 6
Property	Flat 6, 192 Hawthorn Road, Bognor Regis, PO21 2UX		

SAP Rating	79 C	DER	23.08	TER	
Environmental	84 B	% DER < TER			N/A
CO_2 Emissions (t/year)	1.08	DFEE	65.40	TFEE	
Compliance Check	N/A	% DFEE < TFEE			
% DPER < TPER		DPER	123.39	TPER	

Assessor Details	Mr. Mitchell Finn	Assessor ID	AX89-0001
Client			

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SAP 10 WORKSHEET FOR Conversion (As Designed)   (Version 10.2, February 2022)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE
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1. Overall dwelling characteristics

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                                                          Area         Storey height             Volume
Main dwelling                                             (m2)              (m)                   (m3)
      Ground floor                                     54.3500 (1b)    x      2.5000 (2b)    =    135.8750 (1b) - (3b)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)        54.3500                                      (4)
Dwelling volume                                             (3a)+(3b)+(3c)+(3d)+(3e)...(3n) =    135.8750 (5)
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2. Ventilation rate

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                                                                                              m3 per hour

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

                                                                                    Air changes per hour
Infiltration due to chimneys, flues and fans   = (6a)+(6b)+(6c)+(6d)+(6e)+(6f)+(6g)+(7a)+(7b)+(7c) =   20.0000 / (5) =   0.1472 (8)
Pressure test                                                                                        No
Pressure Test Method                                                                         Blower Door
Measured/design AP50                                                                            15.0000 (17)
Infiltration rate                                                                                0.8972 (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) =           0.7626 (21)
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	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	0.9723	0.9533	0.9342	0.8389	0.8198	0.7245	0.7245	0.7054	0.7626	0.8198	0.8579	0.8961	(22b)
Effective ac	0.9727	0.9544	0.9364	0.8519	0.8360	0.7624	0.7624	0.7488	0.7908	0.8360	0.8680	0.9015	(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								
Window			8.8500	1.3258	11.7330			(27)
Door to stairwell			1.6800	0.3500	0.5880			(26)
External Wall	43.2000	10.5300	32.6700	0.3600	11.7612	9.0000	294.0300	(29a)
Wall to corridor	6.4500		6.4500	0.2600	1.6770	9.0000	58.0500	(29a)
Roof	47.4000		47.4000	0.1200	5.6880	9.0000	426.6000	(30)
Total net area of external elements Aum(A, m2)			97.0500					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		31.4472			(33)
Main dwelling								
Party Wall			35.4800	0.0000	0.0000	70.0000	2483.6000	(32)
Party Floor 1			54.3500			30.0000	1630.5000	(32d)
Party Ceiling 1			6.9500			20.0000	139.0000	(32b)
Internal Wall Stud			38.0500			9.0000	342.4500	(32c)
Internal Wall Brick			59.0000			75.0000	4425.0000	(32c)

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Heat capacity Cm = Sum(A x k)                                 (28)...(30) + (32) + (32a)...(32e) =   9799.2300 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K                                                   180.2986 (35)
Thermal bridges (Default value 0.200 * total exposed area)                                           19.4100 (36)
Point Thermal bridges                                                                     (36a) =     0.0000
Total fabric heat loss                                                    (33) + (36) + (36a) =      50.8572 (37)
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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	43.6154	42.7923	41.9856	38.1962	37.4872	34.1868	34.1868	33.5756	35.4581	37.4872	38.9215	40.4209	(38)
Heat transfer coeff	94.4726	93.6495	92.8427	89.0534	88.3444	85.0440	85.0440	84.4328	86.3152	88.3444	89.7786	91.2781	(39)
Average = Sum(39)m / 12 =												89.0500	

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.7382	1.7231	1.7082	1.6385	1.6255	1.5647	1.5647	1.5535	1.5881	1.6255	1.6519	1.6794	(40)
HLP (average)												1.6385	
Days in mont	31	28	31	30	31	30	31	31	30	31	30	31	

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4. Water heating energy requirements (kWh/year)

Assumed occupancy 1.8183 (42)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage for mixer showers	70.2205	69.1652	67.6275	64.6853	62.5140	60.0926	58.7163	60.2424	61.9153	64.5151	67.5205	69.9514	(42a)
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	(42b)
Hot water usage for other uses	33.2511	32.0420	30.8328	29.6237	28.4146	27.2054	27.2054	28.4146	29.6237	30.8328	32.0420	33.2511	(42c)
Average daily hot water use (litres/day)												94.9692	(43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	103.4716	101.2072	98.4603	94.3090	90.9286	87.2981	85.9218	88.6570	91.5390	95.3480	99.5625	103.2026	(44)
Energy conte	163.8737	144.1177	151.3298	129.1043	122.4073	107.3432	103.9149	109.7759	112.8768	129.3863	141.8450	161.5903	(45)
Energy content (annual)										Total = Sum(45)m =		1577.5652	
Distribution loss (46)m = 0.15 x (45)m	24.5811	21.6177	22.6995	19.3656	18.3611	16.1015	15.5872	16.4664	16.9315	19.4079	21.2768	24.2385	(46)
Water storage loss: Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	50.9589	46.0274	50.9589	49.3151	50.9589	49.3151	50.9589	50.9589	49.3151	50.9589	49.3151	50.9589	(61)
Total heat required for water heating calculated for each month	214.8326	190.1451	202.2887	178.4193	173.3662	156.6582	154.8738	160.7348	162.1918	180.3452	191.1601	212.5492	(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	214.8326	190.1451	202.2887	178.4193	173.3662	156.6582	154.8738	160.7348	162.1918	180.3452	191.1601	212.5492	(64)

Total per year (kWh/year) = Sum(64)m = 2177.5652 (64)
12Total per year (kWh/year) 2178 (64)

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Heat gains from water heating, kWh/month	67.2277	59.4260	63.0569	55.2559	53.4402	48.0204	47.2914	49.2402	49.8603	55.7607	59.4922	66.4685	(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	90.9145	90.9145	90.9145	90.9145	90.9145	90.9145	90.9145	90.9145	90.9145	90.9145	90.9145	90.9145	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	83.1244	92.0306	83.1244	85.8952	83.1244	85.8952	83.1244	83.1244	85.8952	83.1244	85.8952	83.1244	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	158.5089	160.1537	156.0088	147.1848	136.0461	125.5772	118.5834	116.9386	121.0835	129.9075	141.0462	151.5151	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	32.0914	32.0914	32.0914	32.0914	32.0914	32.0914	32.0914	32.0914	32.0914	32.0914	32.0914	32.0914	(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)	-72.7316	-72.7316	-72.7316	-72.7316	-72.7316	-72.7316	-72.7316	-72.7316	-72.7316	-72.7316	-72.7316	-72.7316	(71)
Water heating gains (Table 5)	90.3599	88.4315	84.7539	76.7444	71.8282	66.6950	63.5638	66.1831	69.2504	74.9471	82.6281	89.3394	(72)
Total internal gains	385.2675	393.8902	377.1615	363.0987	344.2730	328.4418	315.5459	316.5204	326.5035	341.2534	362.8439	377.2532	(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	3.9100	10.6334	0.6300	0.7000	0.7700	12.7063	(74)
West	4.9400	19.6403	0.6300	0.7000	0.7700	29.6515	(80)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Solar gains	42.3578	82.2870	136.7871	205.5949	260.0206	270.3603	255.6341	213.7310	160.7099	97.7324	52.6468	34.9765	(83)
Total gains	427.6253	476.1772	513.9485	568.6937	604.2936	598.8020	571.1801	530.2514	487.2133	438.9858	415.4907	412.2298	(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	28.8127	29.0659	29.3185	30.5660	30.8113	32.0071	32.0071	32.2388	31.5357	30.8113	30.3191	29.8211	
alpha	2.9208	2.9377	2.9546	3.0377	3.0541	3.1338	3.1338	3.1493	3.1024	3.0541	3.0213	2.9881	
util living area	0.9838	0.9766	0.9632	0.9267	0.8547	0.7208	0.5824	0.6311	0.8261	0.9424	0.9757	0.9855	(86)
MIT	18.4265	18.6734	19.0950	19.7498	20.3052	20.7401	20.9042	20.8757	20.5569	19.8499	19.0921	18.4621	(87)
Th 2	19.5136	19.5243	19.5349	19.5852	19.5947	19.6393	19.6393	19.6476	19.6220	19.5947	19.5755	19.5556	(88)

util rest of house

	0.9795	0.9703	0.9526	0.9037	0.8044	0.6205	0.4311	0.4837	0.7479	0.9197	0.9680	0.9816	(89)
MIT 2	17.2483	17.4994	17.9221	18.5915	19.1135	19.5078	19.6110	19.6066	19.3644	18.7046	17.9500	17.3110	(90)
Living area fraction									fLA = Living area / (4) =			0.2695	(91)
MIT	17.5659	17.8159	18.2383	18.9037	19.4347	19.8400	19.9596	19.9487	19.6858	19.0133	18.2578	17.6212	(92)
Temperature adjustment												0.0000	
adjusted MIT	17.5659	17.8159	18.2383	18.9037	19.4347	19.8400	19.9596	19.9487	19.6858	19.0133	18.2578	17.6212	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9711	0.9598	0.9396	0.8895	0.7975	0.6372	0.4700	0.5201	0.7523	0.9070	0.9578	0.9741	(94)
Useful gains	415.2574	457.0213	482.8860	505.8280	481.9337	381.5819	268.4380	275.8029	366.5155	398.1740	397.9526	401.5332	(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	1253.2623	1209.5633	1089.8149	890.8635	683.3181	445.6263	285.7145	299.6254	482.1430	743.2697	1001.7347	1225.0654	(97)
Space heating kWh	623.4756	505.7082	451.5551	277.2256	149.8300	0.0000	0.0000	0.0000	0.0000	256.7512	434.7232	612.7079	(98a)
Space heating requirement - total per year (kWh/year)												3311.9768	
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	623.4756	505.7082	451.5551	277.2256	149.8300	0.0000	0.0000	0.0000	0.0000	256.7512	434.7232	612.7079	(98c)
Space heating requirement after solar contribution - total per year (kWh/year)												3311.9768	
Space heating per m2										(98c) / (4) =		60.9379	(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 %)	89.9000	(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	623.4756	505.7082	451.5551	277.2256	149.8300	0.0000	0.0000	0.0000	0.0000	256.7512	434.7232	612.7079	(98)
Space heating efficiency (main heating system 1)	89.9000	89.9000	89.9000	89.9000	89.9000	0.0000	0.0000	0.0000	0.0000	89.9000	89.9000	89.9000	(210)
Space heating fuel (main heating system)	693.5212	562.5231	502.2860	308.3710	166.6629	0.0000	0.0000	0.0000	0.0000	285.5965	483.5630	681.5439	(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	214.8326	190.1451	202.2887	178.4193	173.3662	156.6582	154.8738	160.7348	162.1918	180.3452	191.1601	212.5492	(64)
Efficiency of water heater												80.3000	(216)
(217)m	87.2276	87.0560	86.6934	85.8797	84.4822	80.3000	80.3000	80.3000	80.3000	85.6740	86.7330	87.2146	(217)
Fuel for water heating, kWh/month	246.2898	218.4169	233.3380	207.7550	205.2103	195.0912	192.8690	200.1678	201.9824	210.5017	220.4006	243.7083	(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	17.6717	14.1769	12.7647	9.3520	7.2237	5.9019	6.5897	8.5656	11.1259	14.5977	16.4881	18.1629	(232)
Electricity generated by PVs (Appendix M) (negative quantity)													
(233a)m	-12.5022	-20.0967	-33.2176	-42.0620	-48.7826	-46.7585	-45.9715	-41.4787	-33.9340	-24.7095	-14.4489	-10.4517	(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	-3.9566	-9.6461	-22.8844	-40.0393	-57.9212	-60.1308	-58.6807	-46.5774	-30.1532	-14.8518	-5.5373	-3.0006	(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	3684.0676	(211)
Space heating fuel - main system 2	0.0000	(213)
Space heating fuel - secondary	0.0000	(215)
Efficiency of water heater	80.3000	
Water heating fuel used	2575.7310	(219)
Space cooling fuel	0.0000	(221)
Electricity for pumps and fans:		
central heating pump	41.0000	(230c)
main heating flue fan	45.0000	(230e)
Total electricity for the above, kWh/year	86.0000	(231)
Electricity for lighting (calculated in Appendix L)	142.6208	(232)
Energy saving/generation technologies (Appendices M ,N and Q)		
PV generation	-727.7934	(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	5760.6261	(238)

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

	Energy	Emission factor	Emissions

	kWh/year	kg CO2/kWh	kg CO2/year
Space heating - main system 1	3684.0676	0.2100	773.6542 (261)
Total CO2 associated with community systems			0.0000 (373)
Water heating (other fuel)	2575.7310	0.2100	540.9035 (264)
Space and water heating			1314.5577 (265)
Pumps, fans and electric keep-hot	86.0000	0.1387	11.9293 (267)
Energy for lighting	142.6208	0.1443	20.5846 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-374.4140	0.1323	-49.5351
PV Unit electricity exported	-353.3794	0.1223	-43.2084
Total			-92.7435 (269)
Total CO2, kg/year			1254.3281 (272)
EPC Dwelling Carbon Dioxide Emission Rate (DER)			23.0800 (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	3684.0676	1.1300	4162.9964 (275)
Total CO2 associated with community systems			0.0000 (473)
Water heating (other fuel)	2575.7310	1.1300	2910.5761 (278)
Space and water heating			7073.5725 (279)
Pumps, fans and electric keep-hot	86.0000	1.5128	130.1008 (281)
Energy for lighting	142.6208	1.5338	218.7565 (282)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-374.4140	1.4888	-557.4400
PV Unit electricity exported	-353.3794	0.4486	-158.5421
Total			-715.9821 (283)
Total Primary energy kWh/year			6706.4477 (286)
Dwelling Primary energy Rate (DPER)			123.3900 (287)