elmhurst energy

SAP Report Submission for Building Regulations Compliance

Client: Dave Cottle Civil Engineering

Project: Plot 3, Land adjacent to Dolwar
Pentre Llanrhaeadr, Denbigh, Denbighshire, LL16 4NT

Contact: Stuart Hatherall
Blueprint Planning & Design Ltd
stuart@blueprintarchitectural.com

Report Issue Date: 11/07/2022

EXCELLENCE IN ENERGY ASSESSMENT

PREDICTED ENERGY ASSESSMENT

Design SAP
elmhurst energy

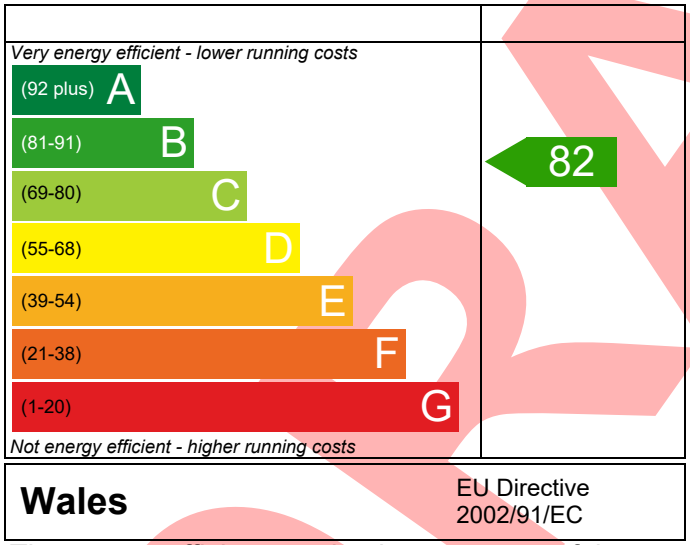
Plot 3, Land adjacent to Dolwar,
Pentre Llanrhaeadr,
Denbigh,
Denbighshire,
LL16 4NT

Dwelling type:	House, End-Terrace
Date of assessment:	11/07/2022
Produced by:	Blueprint Planning & Design Ltd
Total floor area:	86.56 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

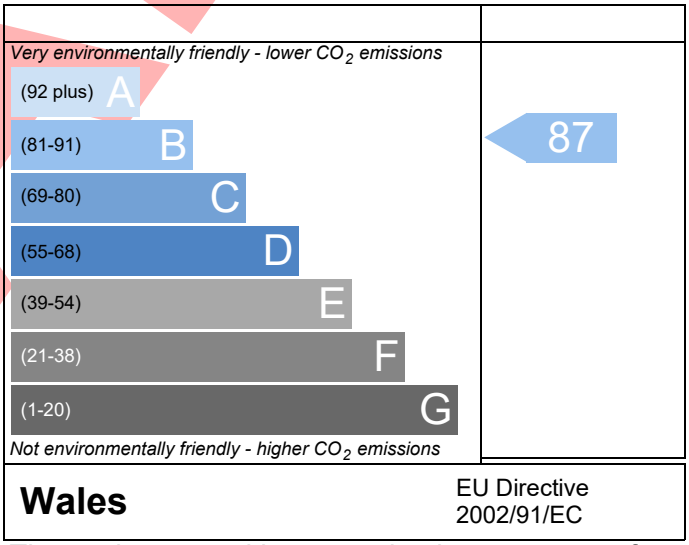
The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO_2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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BUILDING REGULATION COMPLIANCE
Calculation Type: New Build (As Designed)

Design SAP
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Property Reference	C102 Plot 3	**Issued on Date**	11/07/2022
Assessment Reference	As Designed	**Prop Type Ref**	
Property	Plot 3, Land adjacent to Dolwar, Pentre Llanrhaeadr, Denbigh, Denbighshire, LL16 4NT		

SAP Rating	82 B	**DER**	16.59	**TER**	17.82
Environmental	87 B	**% DER<TER**	6.89		
CO_2 Emissions (t/year)	1.17	**FEE**	56.82	**TFEE**	N/A
General Requirements Compliance	Pass	**% DFEE<TFEE**	N/A		

Assessor Details	Mr. Stuart Hatherall, Blueprint Planning & Design Ltd, Tel: 01978 356 500, stuart@blueprintarchitectural.com	**Assessor ID**	N887-0001
Client	Dave Cottle Civil Engineering, Dave Cottle Civil Engineering		

SUMARY FOR INPUT DATA FOR New Build (As Designed)

Criteria 1 – The DER must be no greater than the TER

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	17.82	$kgCO_2/m^2$	
Dwelling Carbon Dioxide Emission Rate (DER)	16.59	$kgCO_2/m^2$	Pass
	-1.23 (-6.9%)	$kgCO_2/m^2$	

Criteria 2 – Limits on design flexibility

Building Fabric

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.21)	0.21 (max. 0.70)	Pass
Party wall	0.20 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.18)	0.14 (max. 0.70)	Pass
Roof	0.13 (max. 0.15)	0.15 (max. 0.35)	Pass
Openings	1.36 (max. 1.60)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	6.00 (design value)	$m^3/(h.m^2)$ @ 50 Pa	
Maximum	10.0	$m^3/(h.m^2)$ @ 50 Pa	Pass

Fixed Building Services

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Worcester Greenstar 4000 GR4700iW 30 C NG Combi boiler Efficiency: 89.3% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

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5 Cylinder insulation

Hot water storage	No cylinder	

6 Controls

Space heating controls	Programmer, TRVs and flow switch	Pass
Hot water controls	No cylinder	
Boiler interlock	Yes	Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting overheating due to solar and other gains

9 Summertime temperature

Overheating risk (Wales)	Not significant	Pass

Based on:

Overshading	Average
Windows facing East	6.52 m², No overhang
Windows facing South	0.96 m², No overhang
Windows facing West	6.05 m², No overhang
Air change rate	8.00 ach
Blinds/curtains	None

Criterion 4 – Building performance consistent with DER

Party Walls

Type	U-value		
Unfilled Cavity with Edge Sealing	0.20	W/m²K	Pass

Air-pressure testing

3 Air permeability

Air permeability at 50 pascals	6.00 (design value)	m³/(h.m²) @ 50 Pa	
Maximum	10.0	m³/(h.m²) @ 50 Pa	Pass

10 Key features

Door U-value	1.20	W/m²K
Roof window U-value	1.10	W/m²K
Photovoltaic array	0.96	kW

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	Typical cost	Typical savings per year	Energy efficiency	Environmental impact	Result
Low energy lights			0	0	Already installed
Solar water heating	£4,000 - £6,000	£26	B 83	B 89	Recommended
Photovoltaic			0	0	Already installed
Wind turbine	£15,000 - £25,000	£695	A 104	A 108	Recommended
Totals	**£19,000 - £31,000**	**£721**	**A 104**	**A 108**	

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THERMAL BRIDGING
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CO_2 Emissions (t/year)	1.17	**FEE**	56.82	**TFEE**	N/A
General Requirements Compliance	Pass	**% DFEE<TFEE**	N/A		

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	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E1 Steel lintel with perforated steel base plate	Table K1 - Approved	0.500	7.41	3.71	
External wall	E3 Sill	Table K1 - Approved	0.040	8.30	0.33	
External wall	E4 Jamb	Table K1 - Approved	0.050	24.78	1.24	
External wall	E5 Ground floor (normal)	Table K1 - Approved	0.160	18.72	3.00	
External wall	E6 Intermediate floor within a dwelling	Table K1 - Approved	0.070	18.72	1.31	
External wall	E10 Eaves (insulation at ceiling level)	Table K1 - Approved	0.060	3.94	0.24	
External wall	E11 Eaves (insulation at rafter level)	Table K1 - Approved	0.040	6.48	0.26	
External wall	E12 Gable (insulation at ceiling level)	Table K1 - Approved	0.240	6.62	1.59	
External wall	E13 Gable (insulation at rafter level)	Table K1 - Approved	0.040	1.96	0.08	
External wall	E16 Corner (normal)	Table K1 - Approved	0.090	8.67	0.78	
External wall	E25 Staggered party wall between dwellings	Table K1 - Default	0.120	8.67	1.04	
Party wall	P1 Party wall - Ground floor	Table K1 - Default	0.160	8.34	1.33	
Party wall	P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	0.000	8.34	0.00	
Party wall	P4 Party wall - Roof (insulation at ceiling level)	Table K1 - Default	0.240	6.62	1.59	
Party wall	P5 Party wall - Roof (insulation at rafter level)	Table K1 - Default	0.080	1.96	0.16	
External roof	R1 Head of roof window	Table K1 - Default	0.080	1.10	0.09	
External roof	R2 Sill of roof window	Table K1 - Default	0.060	1.10	0.07	
External roof	R3 Jamb of roof window	Table K1 - Default	0.080	3.92	0.31	
External roof	R6 Flat ceiling	Table K1 - Default	0.060	6.48	0.39	

Total: 17.50 **W/mK:**

Y-Value: 0.098 **W/m²K:**

BASIC COMPLIANCE REPORT
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CO_2 Emissions (t/year)	1.17	**FEE**	56.82	**TFEE**	N/A
General Requirements Compliance	Pass	**% DFEE<TFEE**	N/A		

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1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
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Dwelling Carbon Dioxide Emission Rate (DER)	16.59	$kgCO_2/m^2$	Pass
	-1.23 (-6.9%)	$kgCO_2/m^2$	

Criteria 2 – Limits on design flexibility

Building Fabric

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.21)	0.21 (max. 0.70)	Pass
Party wall	0.20 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.18)	0.14 (max. 0.70)	Pass
Roof	0.13 (max. 0.15)	0.15 (max. 0.35)	Pass
Openings	1.36 (max. 1.60)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	6.00 (design value)	
Maximum	10.0	Pass

Fixed Building Services

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Worcester Greenstar 4000 GR4700iW 30 C NG Combi boiler Efficiency: 89.3% SEDBUK2009 Minimum: 88.0%	Pass
Secondary heating system	None	

5 Cylinder insulation

Hot water storage	No cylinder	

6 Controls

Space heating controls	Programmer, TRVs and flow switch		Pass
Hot water controls	No cylinder		
Boiler interlock	Yes		Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting overheating due to solar and other gains

9 Summertime temperature

Overheating risk (Wales)	Not significant	Pass

Based on:

Overshading	Average
Windows facing East	6.52 m², No overhang
Windows facing South	0.96 m², No overhang
Windows facing West	6.05 m², No overhang
Air change rate	8.00 ach
Blinds/curtains	None

Criterion 4 – Building performance consistent with DER

Party Walls

Type	U-value		
Unfilled Cavity with Edge Sealing	0.20	W/m²K	Pass

Air-pressure testing

3 Air permeability

Air permeability at 50 pascals	6.00 (design value)		
Maximum	10.0		Pass

10 Key features

Door U-value	1.20	W/m²K
Roof window U-value	1.10	W/m²K
Photovoltaic array	0.96	kW

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

Orientation	South
Property Tenure	Unknown
Transaction Type	Marketed sale
Terrain Type	Rural
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	2
3.0 Date Built	2022
4.0 Sheltered Sides	0
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	18.72 m	43.28 m²	2.40 m
1st Storey:	18.72 m	43.28 m²	2.48 m

7.0 Living Area	17.00	m²
8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	254.07	kJ/m²K

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
External Cavity Walls	Cavity Wall	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20	140.00	85.78	71.44
Dormer Cheeks	Timber Frame	Timber framed wall (one layer of plasterboard)	0.21	9.00	2.04	0.89

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Party Wall 1	Unfilled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.20	110.00	40.77

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall Block	Dense block, plasterboard on dabs	75.00	63.51
Internal wall stud	Plasterboard on timber frame	9.00	84.40

10.0 External Roofs

SUMMARY FOR INPUT DATA
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Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
Flat Ceiling	External Plane Roof	Plasterboard, insulated at ceiling level	0.13	9.00	41.07	41.07
Sloping Ceiling	External Slope Roof	Plasterboard, insulated slope	0.15	9.00	6.33	5.25

10.2 Internal Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Ceiling	Plasterboard ceiling, carpeted chipboard floor	9.00	43.28

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Heat Loss Floor 1	Ground Floor - Solid	Other	0.14	0.00	43.28

11.2 Internal Floors

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1	Plasterboard ceiling, carpeted chipboard floor	18.00	43.28

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Windows	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40
Doors	Manufacturer	Half Glazed Door	Double Low-E Soft 0.05			0.63		0.70	1.20
Rooflights	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.10

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Front Windows	Window	[1] External Cavity Walls	West	None	0.00					5.26	
Rooflights	Roof Window	[2] Sloping Ceiling	East	None						1.08	
Door	Half Glazed Door	[1] External Cavity Walls	South							1.96	
Front Window Dorm	Window	[2] Dormer Cheeks	West	None	0.00					0.79	
Rear Window Dorm	Window	[2] Dormer Cheeks	East	None	0.00					0.36	
Rear Windows	Window	[1] External Cavity Walls	East	None	0.00					6.16	
Side Window	Window	[1] External Cavity Walls	South	None	0.00					0.96	

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

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

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Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E1 Steel lintel with perforated steel base plate	7.41	0.500	No
Table K1 - Approved	E3 Sill	8.30	0.040	No
Table K1 - Approved	E4 Jamb	24.78	0.050	No
Table K1 - Approved	E5 Ground floor (normal)	18.72	0.160	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	18.72	0.070	No
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	3.94	0.060	No
Table K1 - Approved	E11 Eaves (insulation at rafter level)	6.48	0.040	No
Table K1 - Approved	E12 Gable (insulation at ceiling level)	6.62	0.240	No
Table K1 - Approved	E13 Gable (insulation at rafter level)	1.96	0.040	No
Table K1 - Approved	E16 Corner (normal)	8.67	0.090	No
Table K1 - Default	E25 Staggered party wall between dwellings	8.67	0.120	No
Table K1 - Default	P1 Party wall - Ground floor	8.34	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	8.34	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	6.62	0.240	No
Table K1 - Default	P5 Party wall - Roof (insulation at rafter level)	1.96	0.080	No
Table K1 - Default	R1 Head of roof window	1.10	0.080	Yes
Table K1 - Default	R2 Sill of roof window	1.10	0.060	Yes
Table K1 - Default	R3 Jamb of roof window	3.92	0.080	Yes
Table K1 - Default	R6 Flat ceiling	6.48	0.060	No

Y-value	0.098	W/m²K

18.0 Pressure Testing — Yes

Designed AP_{50}	6.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP_{50}		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	Yes
Air change rate	8.00

Mechanical Ventilation

Mechanical Ventilation System Present	No

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System — No

22.0 Lighting

Internal

Total number of light fittings	29	
Total number of L.E.L. fittings	29	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	Database	
Description	Main Gas Boiler	
Percentage of Heat	100	%
Database Ref. No.	18907	
Fuel Type	Mains gas	
Main Heating	BGW	
SAP Code	104	
In Winter	90.2	
In Summer	87.6	
Controls	CBG Programmer, TRVs and flow switch	
PCDF Controls	0	
Delayed Start Stat	Yes	
Sap Code	2108	
Flue Type	Balanced	
Fan Assisted Flue	Yes	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	
Flow Temperature	Normal (> 45°C)	
Combi boiler type	Standard Combi	
Combi keep hot type	None	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HWP From main heating 1	
Water Heating	Main Heating 1	
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	
SAP Code	901	
29.0 Hot Water Cylinder	None	
32.0 Photovoltaic Unit	One Dwelling	

PV Cells kWp	Orientation	Elevation	Overshading	Connected to Dwelling
0.96	East	30°	None Or Little	No

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000	£26	B 83	

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Wind turbine	£15,000 - £25,000	£695	A 104	