



elmhurst
energy



SAP Report Submission for Building Regulations Compliance

Client: Dave Cottle Civil Engineering

Project: Plot 1, 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

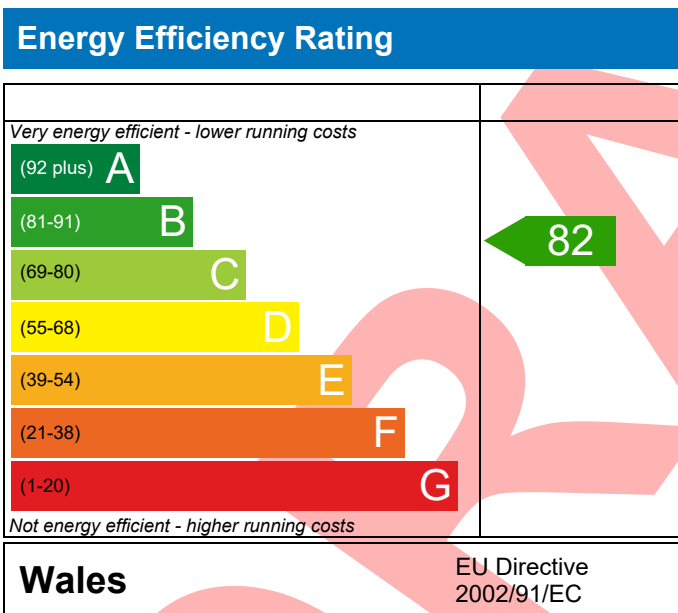
PREDICTED ENERGY ASSESSMENT

Plot 1, Land adjacent to Dolwar,
Pentre Llanrhaeadr,
Denbigh,
Denbighshire,
LL16 4NT

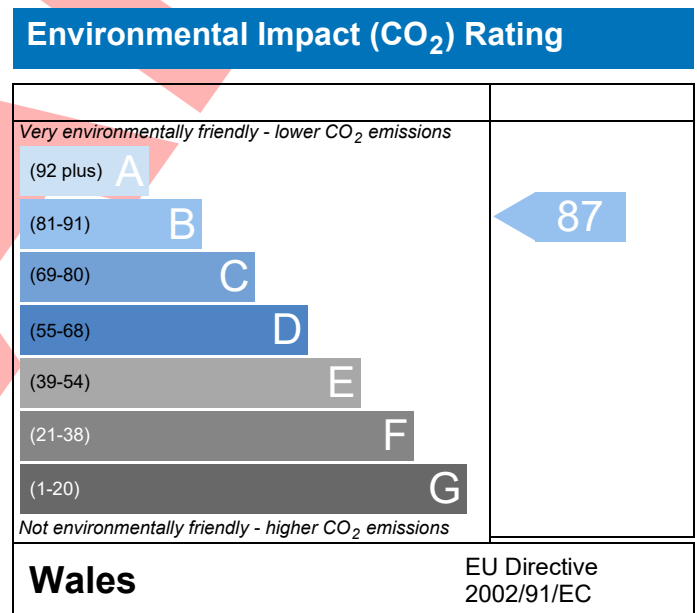
Dwelling type: House, End-Terrace
Date of assessment: 11/07/2022
Produced by: Blueprint Planning & Design Ltd
Total floor area: 86.56 m²

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 (CO₂) emissions.



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.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)

Property Reference	C102 Plot 1	Issued on Date	11/07/2022
Assessment Reference	As Designed	Prop Type Ref	
Property	Plot 1, Land adjacent to Dolwar, Pentre Llanrhaeadr, Denbigh, Denbighshire, LL16 4NT		
SAP Rating	82 B	DER	16.76
Environmental	87 B	TER	17.97
CO ₂ Emissions (t/year)	1.19	% DER<TER	6.73
General Requirements Compliance	Pass	FEE	57.50
		TFEE	N/A
		% 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		

SUMMARY 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)	17.97	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.76	kgCO ₂ /m ²	Pass
	-1.21 (-6.7%)	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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BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)

5 Cylinder insulation

Hot water storage

6 Controls

Space heating controls

Hot water controls

Boiler interlock

7 Low energy lights

Percentage of fixed lights with low-energy fittings %

Minimum %

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting overheating due to solar and other gains

9 Summertime temperature

Overheating risk (Wales)

Based on:

Overshading

Windows facing North

Windows facing East

Windows facing West

Air change rate

Blinds/curtains

Criterion 4 – Building performance consistent with DER

Party Walls

Type	U-value		
Unfilled Cavity with Edge Sealing	<input type="text" value="0.20"/>	W/m ² K	<input type="text" value="Pass"/>

Air-pressure testing

3 Air permeability

Air permeability at 50 pascals m³/(h.m²) @ 50 Pa

Maximum m³/(h.m²) @ 50 Pa

10 Key features

Door U-value W/m²K

Roof window U-value W/m²K

Photovoltaic array kW

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RECOMMENDATIONS

	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	

DRAFT

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THERMAL BRIDGING

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Environmental	87 B	% DER<TER	6.73		
CO ₂ Emissions (t/year)	1.19	FEE	57.50	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
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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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General Requirements Compliance	Pass	% DFEE<TFEE	N/A		

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Client	Dave Cottle Civil Engineering, Dave Cottle Civil Engineering
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SUMMARY 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)	17.97	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.76	kgCO ₂ /m ²	Pass
	-1.21 (-6.7%)	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	
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BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

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 North	0.96 m ² , No overhang	
Windows facing East	6.52 m ² , No overhang	
Windows facing West	6.05 m ² , 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/m ² K	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/m ² K
Roof window U-value	1.10	W/m ² K
Photovoltaic array	0.96	kW

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

Orientation	North
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 m ²	2.40 m
1st Storey:	18.72 m	43.28 m ²	2.48 m

7.0 Living Area m²

8.0 Thermal Mass Parameter
 Thermal Mass
 kJ/m²K

9.0 External Walls

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)
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/m ² K)	Kappa (kJ/m ² K)	Area (m ²)
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/m ² K)	Area (m ²)
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

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
External Roof	Timber frame, gable roof, asphalt	15.00	100.00

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area (m ²)	Nett Area (m ²)
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/m ² K)	Area (m ²)
Internal Ground Floor	Plasterboard ceiling, carpeted chipboard floor	9.00	43.28

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)
Heat Loss Floor 1	Ground Floor - Solid	Other	0.14	0.00	43.28

11.2 Internal Floors

Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
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/m ² K)
Windows	Manufacture	Window	Double Low-E Soft 0.05			0.63		0.70	1.40
Doors	Manufacture	Half Glazed Door	Double Low-E Soft 0.05			0.63		0.70	1.20
Rooflights	Manufacture	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 (m ²)	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	North							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	North	None	0.00					0.96	

14.0 Conservatory

15.0 Draught Proofing

%

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

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 W/m²K

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa
 Property Tested ?
 As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

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

Mechanical Ventilation

Mechanical Ventilation System Present

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

22.0 Lighting

Internal

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

External

External lights fitted
 Light and motion sensor

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

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			
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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			
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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

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000	£26	B 83	
	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Wind turbine	£15,000 - £25,000	£695	A 104	