



## **Building Energy Performance Ltd**

---

# **INDEPENDENT ENERGY ASSESSMENT in accordance with NPTCBC LOCAL DEVELOPMENT PLAN (2011-2026)**

---

for

## **Residential Development, Rhos Primary School, Pontardawe.**

**Building Energy Performance Ltd**  
Castle House  
Southern Street  
Caerphilly  
Caerphilly County Borough Council  
CF83 1LH  
Tel: 029 20851111  
Fax: 029 20851522  
Email: [office@bepltd.co.uk](mailto:office@bepltd.co.uk)

**Prepared by:**  
Kevin O'Donnell  
CEng BEng MCIBSE  
Code & Energy Assessor

## Contents

	<u>Page</u>
<b>The Requirement</b>	3
<b>The Proposals</b>	3
○ <b>The Development Site</b>	
○ <b>Planning Policy Wales</b>	
○ <b>Definition of Renewable &amp; Low Carbon Energy</b>	
<b>Renewable Energy Assessments</b>	4
○ <b>Wind Energy</b>	
○ <b>Biomass</b>	
○ <b>Energy from Waste</b>	
○ <b>Anaerobic Digestion</b>	
○ <b>Hydropower</b>	
○ <b>CHP &amp; District Heating Networks</b>	
○ <b>Building Integrated Renewables (BIR)</b>	
<b>Conclusion</b>	6
<b>Appendix A - Proposed Development Plan</b>	7
<b>Appendix B - Example SAP Calculations</b>	8

## The Requirement

This Independent Energy Assessment has been produced in response to Policy SP18: Renewable and Low Carbon Energy of Neath Port Talbot County Borough Council's (NPTCBC) Local Development Plan (LDP) 2011-2026, issued by The Strategic Planning Department of NPTCBC.

The policy states that all planning applications for residential developments for 100 or more dwellings are required to submit an independent energy assessment investigating the financial viability and technical feasibility of connecting to existing sources of renewable energy, district heating networks, and incorporating on-site zero/low carbon technology (including microgeneration technologies).

## The Proposals

### The Development Site:

The proposed development comprises the construction of 79 residential units at land adjacent to Rhos Primary School, Neath Road, Pontardawe. A copy of the current development site plan is included within appendix A at the rear of this report for further information.

Whilst the number of dwellings falls below the figure of 100 mentioned above, at least one further phase is proposed, at which point this figure will be exceeded. There will be no mixed-use or co-location.

### Planning Policy Wales:

The NPTCBC LDP has been developed within the framework of the Welsh Government's national planning policy document Planning Policy Wales (currently Edition 8, January 2016). An independent energy assessment is deemed necessary in order to meet two national planning policy expectations as set out in Planning Policy Wales, namely:

- Planning for Sustainable Buildings (Section 4.12). This states that as part of preparing their LDPs: "Local planning authorities should assess strategic sites to identify opportunities to require higher sustainable building standards (including zero carbon) to be required. In bringing forward standards higher than the national minimum, set out in Building Regulations, local planning authorities should ensure that what is proposed is evidence-based and viable."
- Development plans and renewable and low carbon energy (Section 12.9). This indicates that: "Local planning authorities should guide appropriate renewable and low carbon energy development by undertaking an assessment of the potential of all renewable energy sources and renewable and low carbon energy opportunities within their area and include appropriate policies in development plans."

### Definition of Renewable & Low Carbon Energy:

Planning Policy Wales paragraph 12.8.7 states “Renewable energy is the term used to cover those sources of energy, other than fossil fuels or nuclear fuel, which are continuously and sustainably available in our environment. This includes wind, water, solar, geothermal energy and plant material, often referred to as biomass.”

The NPTCBC LDP Renewable Energy Assessment (REA) (2012) covers the following renewable energy options:

Table 1.1: Renewable energy technologies covered by the Toolkit

- **Wind Energy** (on-shore wind and community scale development)
- **Biomass Energy:** including:
  - Forestry residues
  - Miscanthus
  - Short rotation coppice
  - Straw
- **Energy from Waste (EfW):** including:
  - Waste food
  - Municipal waste
  - Industrial and commercial waste
- **Centralised Anaerobic Digestion:** covering:
  - Food waste
  - Agricultural waste
  - Sewage sludge
- **Hydropower Energy**
- **CHP & District Heating Networks**
- **Building Integrated Renewables (BIR):** covering
  - Biomass boilers
  - Air and ground source heat pumps
  - Photovoltaics
  - Small and micro wind power

## Renewable Energy Assessments

### Wind Energy:

Wind energy has been assessed under the NPTCBC LDP Renewable Energy Assessment (2012) as not technically feasible for the following reasons:

1. Wind farms by nature are most usually situated in rural settings away from residential development and where the wind resource is least constrained.
2. A 500m exclusion zone from residential areas is normally applied due to noise generated by the turbine blades and gearbox.

The above factors have led to the site being deemed not suitable for wind generation, as the whole site is planned for residential use only.

### **Biomass:**

Section 4.4: Biomass Energy Resource of the NPTCBC LDP REA (2012) identifies certain areas of land as having the potential for the growing of energy crops, but acknowledges that further detailed study is required before any action can be taken.

In addition, the current scheme submitted for approval could not accommodate the fuel storage and access for large delivery vehicles that would be required for a large scale biomass energy heat generating plant.

### **Energy from Waste:**

Energy from waste is the burning of pre-sorted waste in a highly controlled environment. Energy is recovered during the incineration process by using the heat produced to generate steam. The steam then powers a turbine that can generate electricity for local homes and businesses. Energy from waste plants can also be used to supply hot water for domestic and commercial heating, or high pressure steam that can be used for industrial processes. This type of facility is known as Combined Heat & Power (CHP) plant, because of the two types of energy it produces.

At the current time there are no known operational Energy Recovery from Waste (ERfW) facilities within the local vicinity.

### **Anaerobic Digestion:**

Anaerobic digestion (AD) takes our pre-sorted food waste, digests it, and turns it into energy. The food waste is fed into a digestion tank where it is broken down using naturally occurring micro-organisms, producing methane. This methane gas can be used to power electricity generators (CHP plants).

Whilst a number of planning applications have been made and approved for Anaerobic Digestion plants in South Wales, at the current time there are no known operational AD facilities within the local vicinity.

### **Hydropower:**

Section 4.7: Hydropower Energy Resource of the NPTCBC LDP REA (2012) lists hydropower resource opportunities that have been identified by Natural Resources Wales through their report 'Opportunities and Environmental Sensitivity Mapping for Hydropower in England and Wales (February 2010)'.

The nearest water sources to the proposed site are the river Tawe which runs approximately 1.3km to the North West of the site and the river Clydach which runs approximately 1.5km to the East of the site.

### **CHP & District Heating Networks:**

The NPTCBC LDP REA (2012) acknowledges that CHP/District Heating schemes are more likely

to be economically viable in areas of high density energy demand.

This development is solely residential on 'green field' and has no existing or proposed suitable anchor heat loads within the immediate proximity to make a district heating network worthy of further consideration.

### **Building Integrated Renewables (BIR):**

Planning Policy Wales has an overarching requirement for sourcing 15% of its energy from renewable sources by 2020. Section 5.02: Building Integrated Renewables (BIR) from the NPTCBC LDP REA (2012) predicts that there is likely to be an increasing emphasis on the uptake of microgeneration and BIR technologies, and that microgeneration in NPT could play an important part in any area-wide renewable energy assessment.

In terms of the BIR options available;

- biomass would not be feasible due to the scheme being unable to provide sufficient space and road networks for the fuel storage and delivery requirements.
- The layout and topography of the site makes small and micro wind power unviable (a wind turbine should be a minimum of 30m away from a building for efficient use and to avoid turbulence).
- The Energy Savings Trust does not advise the consideration of heat pumps as a viable economic/environmental option when mains gas is available. Mains gas is available to this site.
- The scheme consists of entirely low rise residential units with no tall overshadowing features close to the site. Each dwelling has a section of sloping roof pitch and orientation that would be suitable for mounting photovoltaic (PV) panels. All properties will have a connection to the National Grid for electricity supply. Therefore, photovoltaic arrays could be considered as technically feasible. Initial SAP energy rating calculations have been completed for typical 4 bed detached and 3 bed semi-detached style dwellings which show that a PV system capable of reducing the CO<sub>2</sub> emissions by 15% can be accommodated on the roof of each dwelling.

Section 5.07: Modelling BIR Uptake – An Overview of the NPTCBC LDP REA (2012) acknowledges the key factors affecting uptake of BIR and microgeneration technologies are likely to be a combination of technical viability, carbon savings and the level of capital cost to a developer.

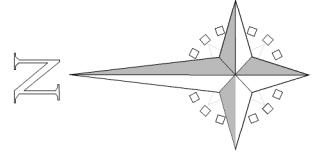
## **Conclusion**

This independent energy assessment concludes that building integrated photovoltaic panels would be the most appropriate form of renewable energy that could be incorporated into the proposed development.

# **APPENDIX – A**

## **SITE DEVELOPMENT PLAN**

Open Mix HouseType	No's	Sq.ft. Total	Sq.ft.	Beds	Storeys	Individual %	Group %
548 - Morden	6	548	3288	2	2	8%	
739 - Moseley	4	739	2956	3	2.5	6%	44%
781 - Hanbury	12	781	9132	3	2	17%	
932 - Souter	9	932	8388	3	2.5	13%	
870 - Rufford	6	870	5220	3	2	8%	
989 - Hatfield	12	989	11828	3	2	17%	35%
999 - Clayton Corner	7	999	6993	3	2	10%	
1096 - Roseberry	8	1096	8768	4	2	11%	
1222 - Chedworth Corner	1	1222	7332	4	2	8%	21%
1222 - Chedworth Corner	1	1222	1222	4	2	1%	
<b>Affordable HouseType</b>	<b>No's</b>	<b>Sq.ft. Total</b>	<b>Sq.ft.</b>	<b>Beds</b>	<b>Storeys</b>	<b>Individual %</b>	<b>Group %</b>
580 - DOR 2.1.1	2	580	1160	1	2	3%	
788 - WHOS	4	788	3152	2	2	5%	10%
835 - WHOS	2	835	1670	3	2	3%	
<b>Total Open Units</b>	<b>71</b>	<b>64927</b>					
<b>Total Affordable Units</b>	<b>8</b>	<b>5982</b>					
<b>Total Units</b>	<b>79</b>	<b>70909</b>					



**SITE LEGEND**

- Site Boundary
- 1.8M High Brick Screen Wall With Finishing Panels
- 1.2M High Timber Post & Rail Fence
- 1.8M High Timber Post & Rail Fence
- 1.0M High Estate Railings With Brick Piers
- Shared Private Drive
- Herringbone Pavers
- Highway Rumble Strip
- Densets Prossed Affordable Units
- Indicative Landscaping (Please refer to landscape drawing for accurate positioning)
- Bin Storage Slabs

**EXTERNAL MATERIALS SCHEDULE**

Brick Type: PC Ederhall  
 Colour: Modern Dux, Smooth Grey, Terracotta  
 Ridge Tile  
 Location: Full Brick

Brick Type: PC Ederhall  
 Colour: Warwick Blend  
 Modern Dux, Smooth Grey  
 Location: Full Brick

**SURFACE FINISHES**

Roads and footpaths to be finished in lammacadam to adoptable standards unless indicated otherwise.  
 Shared surfaces to be finished in lammacadam.  
 All drives to be finished in lammacadam.  
 Private footpaths to be constructed in concrete paving slabs.

Revision Details

Rev	Description	By	Date
1	Issue for tender	MS	07.03.2015
2	Revised to include 100m² LEAP play area	MS	07.03.2015
3	Revised to include 0.16ha Children's Play Space	MS	07.03.2015
4	Revised to include 0.08ha Informal Play Space	MS	07.03.2015
5	Revised to include Indicative Phase 2 Access	MS	07.03.2015
6	Revised to include Ysgol Gynradd Y Rhos Rhos Primary School	MS	07.03.2015
7	Revised to include Neath Road	MS	07.03.2015
8	Revised to include Bryn Brych	MS	07.03.2015
9	Revised to include Drain	MS	07.03.2015
10	Revised to include Track	MS	07.03.2015
11	Revised to include Bin Storage Slabs	MS	07.03.2015
12	Revised to include Herringbone Pavers	MS	07.03.2015
13	Revised to include Shared Private Drive	MS	07.03.2015
14	Revised to include 1.8M High Brick Screen Wall	MS	07.03.2015
15	Revised to include 1.2M High Timber Post & Rail Fence	MS	07.03.2015
16	Revised to include 1.8M High Timber Post & Rail Fence	MS	07.03.2015
17	Revised to include 1.0M High Estate Railings	MS	07.03.2015
18	Revised to include Shared Private Drive	MS	07.03.2015
19	Revised to include Herringbone Pavers	MS	07.03.2015
20	Revised to include Highway Rumble Strip	MS	07.03.2015
21	Revised to include Densets Prossed Affordable Units	MS	07.03.2015
22	Revised to include Indicative Landscaping	MS	07.03.2015
23	Revised to include Bin Storage Slabs	MS	07.03.2015
24	Revised to include Brick Type: PC Ederhall	MS	07.03.2015
25	Revised to include Colour: Modern Dux, Smooth Grey, Terracotta	MS	07.03.2015
26	Revised to include Ridge Tile	MS	07.03.2015
27	Revised to include Location: Full Brick	MS	07.03.2015
28	Revised to include Brick Type: PC Ederhall	MS	07.03.2015
29	Revised to include Colour: Warwick Blend	MS	07.03.2015
30	Revised to include Modern Dux, Smooth Grey	MS	07.03.2015
31	Revised to include Location: Full Brick	MS	07.03.2015
32	Revised to include Roads and footpaths to be finished in lammacadam	MS	07.03.2015
33	Revised to include Shared surfaces to be finished in lammacadam	MS	07.03.2015
34	Revised to include All drives to be finished in lammacadam	MS	07.03.2015
35	Revised to include Private footpaths to be constructed in concrete paving slabs	MS	07.03.2015

**PERSIMMON HOMES**

Site Name: Rhos  
 Date: 07.03.2015  
 Location: Pontardawe  
 Scale: 1:500@A1 1:1000@A3  
 Drawing Name: Planning Layout  
 Drawn By: JP  
 Checked By: MS  
 Approved By: MS  
 Drawing Number: PL-01  
 Revision: K  
 443

## **APPENDIX – B**

### **EXAMPLE SAP ENERGY RATING CALCULATIONS**



elmhurst  
energy



## SAP Calculations

Client: Persimmon Homes (Wales) Ltd  
(0.6kWp PV System)

Project: Roseberry (1096 Det)  
PH Housetypes, Masonry

Contact: Joseph Goode  
Building Energy Performance Ltd  
[office@bepltd.co.uk](mailto:office@bepltd.co.uk)

EXCELLENCE  
IN ENERGY  
ASSESSMENT

## Building Regulation Compliance

Page 2 of 7

**Property Reference:** Roseberry (1096) Det MAS QA  
**Survey Reference:** PHWW Roseberry Det 0.6kWp PV

**Issued on Date:** 06.Sep.2016

**Prop Type Ref:** Roseberry (1096 Det) S4

**Property:** Roseberry (1096 Det), Masonry, PH Housetypes

**SAP Rating:** 86 B **CO2 Emissions (t/year):** 1.37 **DER:** 15.99 Pass **TER:** 19.02 **Percentage DER<TER:** 15.94 %  
**Environmental:** 87 B **General Requirements Compliance:** Pass **FEE:** 54.07 Pass **TFEE:** N/A **Percentage DFEE<TFEE:** N/A

**CfSH Results Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

**Surveyor:** Joseph Goode, Tel: 02920851111, Fax: 02920851522 **Surveyor ID:** 4878-0002  
**Address:** Southern Street, Caerphilly, CF83 1LH  
**Client:** Persimmon Homes (Wales) Ltd, 005

**Software Version:** Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.06r08  
**SAP version:** SAP 2012, Regs Region: Wales (Part L1A 2014), Calculation Type: New Build (As Designed)

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

#### 1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	19.02 kg/m <sup>2</sup>	
Dwelling Carbon Dioxide Emission Rate (DER)	15.99 kg/m <sup>2</sup>	OK

#### 2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.21)	0.30 (max. 0.70)	OK
Floor	0.18 (max. 0.18)	0.18 (max. 0.70)	OK
Roof	0.11 (max. 0.15)	0.11 (max. 0.35)	OK
Openings	1.34 (max. 1.60)	1.40 (max. 3.30)	OK

#### 2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

#### 3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

#### 4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP 35 Combi boiler Efficiency: 88.9% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

#### 5 Cylinder insulation

Hot water storage	No cylinder
-------------------	-------------

#### 6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	No cylinder	
Boiler interlock	Yes	OK

#### 7 Low energy lights

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

#### 8 Mechanical ventilation

Not applicable

#### 9 Summertime temperature

Overheating risk (Severn (Wales)):	Not significant	OK
Based On:		

Overshading:	Average
Windows facing North:	0.66 m <sup>2</sup> , No overhang
Windows facing East:	5.95 m <sup>2</sup> , No overhang
Windows facing West:	9.24 m <sup>2</sup> , No overhang
Air change rate:	8.00 ach
Blinds/curtains:	None

---

**10 Key features**

Roof U-value	0.11 W/m <sup>2</sup> K
Door U-value	1.10 W/m <sup>2</sup> K
Door U-value	1.10 W/m <sup>2</sup> K
Photovoltaic array	

---

## Summary Information

**Property Reference:** Roseberry (1096) Det MAS QA  
**Survey Reference:** PHWW Roseberry Det 0.6kWp PV

**Issued on Date:** 06.Sep.2016

**Prop Type Ref:** Roseberry (1096 Det) S4

**Property:** Roseberry (1096 Det), Masonry, PH Housetypes

**SAP Rating:** 86 B **CO2 Emissions (t/year):** 1.37 **DER:** 15.99 Pass **TER:** 19.02 **Percentage DER<TER:** 15.94 %  
**Environmental:** 87 B **General Requirements Compliance:** Pass **FEE:** 54.07 Pass **TFEE:** N/A **Percentage DFEE<TFEE:** N/A

**CfSH Results Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

**Surveyor:** Joseph Goode, Tel: 02920851111, Fax: 02920851522 **Surveyor ID:** 4878-0002

**Address:** Southern Street, Caerphilly, CF83 1LH

**Client:** Persimmon Homes (Wales) Ltd, 005

**Software Version:** Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.06r08

**SAP version:** SAP 2012, Regs Region: Wales (Part L1A 2014), Calculation Type: New Build (As Designed)

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

Page 4 of 7

Orientation	East
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown

#### 6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	31.07	45.64	2.33
1st Storey:	31.07	56.22	2.55

7.0 Living Area 16.04

8.0 Thermal Mass Parameter Precise calculation

9.0 External Walls Description	Construction	U-Value	Kappa	Gross Area	Nett Area
External Wall 1	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.19	60.00	133.24	113.49
Garage	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.37	60.00	18.38	18.38

9.2 Internal Walls Description	Construction	Kappa	Area
Internal Wall 1	Dense block, plasterboard on dabs	75.00	20.73
Internal Wall 2	Plasterboard on timber frame	9.00	175.50

10.0 External Roofs Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Pitched Plane	Plasterboard, insulated at ceiling level	0.11	9.00	56.22	56.22

10.2 Internal Ceilings Description	Construction	Kappa	Area
Internal Ceiling 1	Plasterboard ceiling, carpeted chipboard floor	9.00	45.64

11.0 HeatLoss Floors Description	Construction	U-Value	Kappa	Area
Heat Loss Floor 1	Slab on ground, screed over insulation	0.18	110.00	45.64
Garage	Timber exposed floor, insulation between joists	0.18	20.00	10.58

11.2 Internal Floors Description	Construction	Kappa	Area
Internal Floor 1	Plasterboard ceiling, carpeted chipboard floor	18.00	45.64

#### 12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value		
Windows	BFRC data	Window	Double Low-E Soft 0.1			0.45			1.40		
Front doors	Manufacturer	Solid Door							1.10		
Rear Door	Manufacturer	Solid Door							1.10		
<b>13.0 Openings</b>											
Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Front	Window	[1] External Wall 1	East	None	0.00					5.95	
Rear	Window	[1] External Wall 1	West	None	0.00					9.24	
Front	Solid Door	[1] External Wall 1	East							1.95	
270 Side Window	Window	[1] External Wall 1	North	None	0.00					0.66	
90 Door	Solid Door	[1] External Wall 1	North							1.95	
14.0 Conservatory			None								
15.0 Draught Proofing			100								
16.0 Draught Lobby			No								
<b>17.0 Thermal Bridging</b>											
Calculate Bridges											
<b>17.1 List of Bridges</b>											
Source Type	Bridge Type					Length	Psi	Imported			
Independently assessed	E2 Other lintels (including other steel lintels)					13.89	0.340	No			
Table K1 - Approved	E3 Sill					10.23	0.040	No			
Table K1 - Approved	E4 Jamb					33.30	0.050	No			
Independently assessed	E5 Ground floor (normal)					31.07	0.067	No			
Table K1 - Default	E20 Exposed floor (normal)					6.00	0.320	No			
Table K1 - Default	E21 Exposed floor (inverted)					6.00	0.320	No			
Independently assessed	E6 Intermediate floor within a dwelling					31.07	0.000	No			
Table K1 - Approved	E10 Eaves (insulation at ceiling level)					12.95	0.060	No			
Independently assessed	E12 Gable (insulation at ceiling level)					18.07	0.048	No			
Independently assessed	E16 Corner (normal)					19.74	0.040	No			
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)					2.55	-0.090	No			
<b>18.0 Pressure Testing</b>											
Designed q50			Yes								
Property Tested ?			5.00								
As Built q50											
Same As Designed ?											
<b>19.0 Mechanical Ventilation</b>											
Mechanical Ventilation System			No								
Present											
Approved Installation											
Windows open in hot weather			Windows fully open								
Cross ventilation possible			Yes								
Night Ventilation			No								
Air change rate			8.00								
Mechanical Ventilation data Type											
Type											
MV Reference Number											
Configuration											
MVHR Duct Insulated											
Manufacturer SFP											
Duct Type											
MVHR Efficiency											
Wet Rooms											
Brand, Model											
<b>20.0 Fans, Open Fireplaces, Flues</b>											
			MHS	SHS	Other	Total					
Number of Chimneys			0		0	0					
Number of open flues			0		0	0					
Number of intermittent fans						3					
Number of passive vents						0					
Number of flueless gas fires						0					
<b>21.0 Cooling System</b>											
			No								
<b>22.0 Lighting</b>											
Internal											

Total number of light fittings	13
Total number of L.E.L. fittings	13
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	Yes
Light and motion sensors	Yes
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage	No
System	
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	17863
Fuel Type	Mains gas
Main Heating	BGW
TestMethod	
SAP Code	104
Efficiency ( Split Efficiencies ) %	
Efficiency ( Split Efficiencies ) %	
In Winter	89.8
In Summer	87.3
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	No
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	Normal (> 45°C)
Electric CPSU Temperature	
Combi boiler type	Standard Combi
Combi keep hot type	None
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	
HETAS Approved System	
Smoke Control Area	

Test Method				
Manufacturer				
Model Name				
29.0 Water Heating		HWP From main heating 1		
Water use <= 125 litres/person/day	Yes			
SAP Code	901			
Immersion Heater				
Summer Immersion				
Supplementary Immersion				
Immersion Only Heating Hot Water				
29.1 Flue Gas Heat Recovery System				
Database ID				
Brand Model				
Details				
29.2 Waste Water Heat Recovery System				
Total rooms with shower and/or bath				
30.0 Hot Water Cylinder	None			
Cylinder Stat				
Cylinder In Heated Space				
Independent Time Control				
Insulation Type				
Insulation Thickness				
Cylinder Volume				
Loss (kwh/day)				
Pipes insulation				
In Airing Cupboard				
31.0 Solar Panel				
Solar Panel Area				
Area Type				
Panel Type				
n0, a1, a2, A/G ratio				
Orientation				
Elevation				
Overshading				
Solar Storage Volume				
Pump electrically powered				
Combined Cylinder				
32.0 Thermal Store				
Thermal Store Pipework				
33.0 Photovoltaic Unit		One Dwelling		
Apportioned KWh/Year				
PV Cells kW Peak	Elevation	Overshading		
0.60	East	30°	None Or Little	
34.0 Wind Turbines				
Terrain Type	Urban			
Wind Turbines Count				
Apportioned Kwh/year				
Rotor Diameter				
Hub Height				
35.0 Small-scale Hydro				
Electricity Generated				
Description				
Apportioned kWh/Year				
Recommendations				
None				
Further measures to achieve even higher standards				
Solar water heating	£4,000 - £6,000	£35	B 87	B 88



elmhurst  
energy



## SAP Calculations

Client: Persimmon Homes (Wales) Ltd  
(0.5kWp PV System)

Project: Rufford (870) EL/SD  
PH Housetypes, Masonry

Contact: Joseph Goode  
Building Energy Performance Ltd  
[office@bepltd.co.uk](mailto:office@bepltd.co.uk)

EXCELLENCE  
IN ENERGY  
ASSESSMENT

## Building Regulation Compliance

Page 2 of 7

**Property Reference:** Rufford (870) EL/SD MAS QA  
**Survey Reference:** PHWW Rufford Semi 0.5kWp PV

**Issued on Date:** 06.Sep.2016  
**Prop Type Ref:** Rufford (870 EL/SD)

**Property:** Rufford (870) EL/SD, Masonry, PH Housetypes

**SAP Rating:** 86 B **CO2 Emissions (t/year):** 1.08 **DER:** 15.88 Pass **TER:** 18.99 **Percentage DER<TER:** 16.39 %  
**Environmental:** 88 B **General Requirements Compliance:** Pass **FEE:** 48.61 Pass **TFEE:** N/A **Percentage DFEE<TFEE:** N/A

**CfSH Results Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

**Surveyor:** Joseph Goode, Tel: 02920851111, Fax: 02920851522 **Surveyor ID:** 4878-0002  
**Address:** Southern Street, Caerphilly, CF83 1LH  
**Client:** Persimmon Homes (Wales) Ltd, 005

**Software Version:** Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.06r08  
**SAP version:** SAP 2012, Regs Region: Wales (Part L1A 2014), Calculation Type: New Build (As Designed)

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

#### 1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	18.99 kg/m <sup>2</sup>	
Dwelling Carbon Dioxide Emission Rate (DER)	15.88 kg/m <sup>2</sup>	OK

#### 2 Fabric U-values

Element	Average	Highest	
External wall	0.21 (max. 0.21)	0.30 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.17 (max. 0.18)	0.17 (max. 0.70)	OK
Roof	0.11 (max. 0.15)	0.11 (max. 0.35)	OK
Openings	1.36 (max. 1.60)	1.40 (max. 3.30)	OK

#### 2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

#### 3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

#### 4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Ideal LOGIC COMBI ESP 35 Combi boiler Efficiency: 88.9% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

#### 5 Cylinder insulation

Hot water storage	No cylinder	
-------------------	-------------	--

#### 6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	No cylinder	
Boiler interlock	Yes	OK

#### 7 Low energy lights

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

#### 8 Mechanical ventilation

Not applicable

#### 9 Summertime temperature

Overheating risk (Severn (Wales)):	Not significant	OK
------------------------------------	-----------------	----

## Based On:

Overshading:	Average
Windows facing East:	5.07 m <sup>2</sup> , No overhang
Windows facing South:	0.66 m <sup>2</sup> , No overhang
Windows facing West:	7.92 m <sup>2</sup> , No overhang
Air change rate:	8.00 ach
Blinds/curtains:	None

**10 Key features**

---

Roof U-value	0.11 W/m <sup>2</sup> K
Door U-value	1.10 W/m <sup>2</sup> K
Door U-value	1.10 W/m <sup>2</sup> K
Photovoltaic array	

---

## Summary Information

**Property Reference:** Rufford (870) EL/SD MAS QA  
**Survey Reference:** PHWW Rufford Semi 0.5kWp PV

**Issued on Date:** 06.Sep.2016  
**Prop Type Ref:** Rufford (870 EL/SD)

**Property:** Rufford (870) EL/SD, Masonry, PH Housetypes

**SAP Rating:** 86 B **CO2 Emissions (t/year):** 1.08 **DER:** 15.88 Pass **TER:** 18.99 **Percentage DER<TER:** 16.39 %  
**Environmental:** 88 B **General Requirements Compliance:** Pass **FEE:** 48.61 Pass **TFEE:** N/A **Percentage DFEE<TFEE:** N/A

**CfSH Results Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

**Surveyor:** Joseph Goode, Tel: 02920851111, Fax: 02920851522 **Surveyor ID:** 4878-0002

**Address:** Southern Street, Caerphilly, CF83 1LH

**Client:** Persimmon Homes (Wales) Ltd, 005

**Software Version:** Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.06r08

**SAP version:** SAP 2012, Regs Region: Wales (Part L1A 2014), Calculation Type: New Build (As Designed)

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

Page 4 of 7

Orientation	East
1.0 Property Type	House, Semi-Detached
2.0 Number of Storeys	2
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

#### 6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	23.46	37.43	2.33
1st Storey:	19.10	43.50	2.55

7.0 Living Area 14.80

8.0 Thermal Mass Parameter Precise calculation

9.0 External Walls Description	Construction	U-Value	Kappa	Gross Area	Nett Area
External Wall 1	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.19	60.00	90.63	75.03
Garage	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.37	60.00	13.08	13.08

#### 9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Single plasterboard on dabs on both sides, dense blocks, cavity or cavity fill	70.00	29.63

#### 9.2 Internal Walls

Description	Construction	Kappa	Area
GF	Plasterboard on timber frame	9.00	27.07
Stud	Plasterboard on timber frame	9.00	102.62

#### 10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Pitched Plane	Plasterboard, insulated at ceiling level	0.11	9.00	43.50	43.50

#### 10.2 Internal Ceilings

Description	Construction	Kappa	Area
Internal Ceiling 1	Plasterboard ceiling, carpeted chipboard floor	9.00	35.88

#### 11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Heat Loss Floor 1	Suspended concrete floor, carpeted	0.17	75.00	37.43
Garage Floor	Timber exposed floor, insulation between joists	0.18	20.00	7.62

#### 11.2 Internal Floors

Description	Construction	Kappa	Area								
Internal Floor 1	Plasterboard ceiling, carpeted chipboard floor	18.00	35.88								
<b>12.0 Opening Types</b>											
Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value		
Windows	BFRC data	Window	Double Low-E Soft 0.1			0.45			1.40		
Front doors	Manufacturer	Solid Door							1.10		
Rear Door	Manufacturer	Solid Door							1.10		
<b>13.0 Openings</b>											
Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Front	Window	[1] External Wall 1	East	None	0.00					5.07	
Rear	Window	[1] External Wall 1	West	None	0.00					7.92	
Front	Solid Door	[1] External Wall 1	East							1.95	
270 Side Window	Window	[1] External Wall 1	South	None	0.00					0.66	
14.0 Conservatory		None									
15.0 Draught Proofing		100									
16.0 Draught Lobby		Yes									
<b>17.0 Thermal Bridging</b>											
Calculate Bridges											
<b>17.1 List of Bridges</b>											
Source Type	Bridge Type	Length	Psi	Imported							
Independently assessed	E2 Other lintels (including other steel lintels)	11.19	0.340	No							
Table K1 - Approved	E3 Sill	8.46	0.040	No							
Table K1 - Approved	E4 Jamb	26.70	0.050	No							
Independently assessed	E5 Ground floor (normal)	23.46	0.050	No							
Table K1 - Default	E20 Exposed floor (normal)	2.46	0.320	No							
Table K1 - Default	E21 Exposed floor (inverted)	8.38	0.320	No							
Independently assessed	E6 Intermediate floor within a dwelling	19.10	0.000	No							
Table K1 - Approved	E10 Eaves (insulation at ceiling level)	12.30	0.060	No							
Independently assessed	E12 Gable (insulation at ceiling level)	8.70	0.048	No							
Independently assessed	E16 Corner (normal)	9.76	0.040	No							
Independently assessed	E18 Party wall between dwellings	9.76	0.039	No							
<b>18.0 Pressure Testing</b>											
	Yes										
Designed q50	5.00										
Property Tested ?											
As Built q50											
Same As Designed ?											
<b>19.0 Mechanical Ventilation</b>											
Mechanical Ventilation System	No										
Present											
Approved Installation											
Windows open in hot weather	Windows fully open										
Cross ventilation possible	Yes										
Night Ventilation	No										
Air change rate	8.00										
Mechanical Ventilation data Type											
Type											
MV Reference Number											
Configuration											
MVHR Duct Insulated											
Manufacturer SFP											
Duct Type											
MVHR Efficiency											
Wet Rooms											
Brand, Model											
<b>20.0 Fans, Open Fireplaces, Flues</b>											
	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 Cooling System	No
22.0 Lighting	
Internal	
Total number of light fittings	10
Total number of L.E.L. fittings	10
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	Yes
Light and motion sensors	Yes
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage	No
System	
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	17863
Fuel Type	Mains gas
Main Heating	BGW
TestMethod	
SAP Code	104
Efficiency ( Split Efficiencies ) %	
Efficiency ( Split Efficiencies ) %	
In Winter	89.8
In Summer	87.3
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	No
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	Normal (> 45°C)
Electric CPSU Temperature	
Combi boiler type	Standard Combi
Combi keep hot type	None
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	

## 28.0 Secondary Heating

Description  
SHS efficiency %  
SAP Code  
HETAS Approved System  
Smoke Control Area  
Test Method  
Manufacturer  
Model Name

## 29.0 Water Heating HWP From main heating 1

Water use <= 125 litres/person/day Yes  
SAP Code 901  
Immersion Heater  
Summer Immersion  
Supplementary Immersion  
Immersion Only Heating Hot Water

## 29.1 Flue Gas Heat Recovery System

Database ID  
Brand Model  
Details

## 29.2 Waste Water Heat Recovery

## System

Total rooms with shower and/or bath

## 30.0 Hot Water Cylinder None

Cylinder Stat  
Cylinder In Heated Space  
Independent Time Control  
Insulation Type  
Insulation Thickness  
Cylinder Volume  
Loss (kwh/day)  
Pipes insulation  
In Airing Cupboard

## 31.0 Solar Panel

Solar Panel Area  
Area Type  
Panel Type  
n0, a1, a2, A/G ratio  
Orientation  
Elevation  
Overshading  
Solar Storage Volume  
Pump electrically powered  
Combined Cylinder

## 32.0 Thermal Store

Thermal Store Pipework

## 33.0 Photovoltaic Unit One Dwelling

Apportioned KWh/Year

## PV Cells kW Peak Orientation Elevation Overshading

PV Cells kW Peak	Orientation	Elevation	Overshading
0.50	East	30°	None Or Little

## 34.0 Wind Turbines

Terrain Type Urban  
Wind Turbines  
Count  
Apportioned Kwh/year  
Rotor Diameter  
Hub Height

## 35.0 Small-scale Hydro

Electricity Generated  
Description  
Apportioned kWh/Year

## Recommendations

None

Further measures to achieve even higher standards

Solar water heating	£4,000 - £6,000	£34	B 87	B 90
---------------------	-----------------	-----	------	------