

46 Beechwood Avenue Worthing, BN13 2HS

Overview

Type: semi detached bungalow

Age: 1930s

Beds: 2 bedrooms

Walls: cavity

Area: 85 m² approx

Residents: 2

Features

Cavity wall insulation

Condensing boiler

Double glazing

Draught-proofing

Heating controls

Low energy appliances

Low energy lighting

Loft insulation

Rainwater harvesting

Solar PV (3kWp)

Underfloor heating

Wood-burning stove

Introduction and approach

Pauline and Alan downsized to this bungalow 7 years ago, after the children had left home. They live and work part-time in Brittany and their home had to be secure as well as cheaper to run. They needed space for Pauline to run her homeopathic practice and Alan to store materials for his property renovation business. The addition of a conservatory has added space for when family visit.

Pauline is doing a Permaculture Diploma and has used their home as a case study, including an audit of energy and water use. The first thing they did was insulate the loft and cavity walls. They have since added a woodburning stove, which takes over from the boiler and runs on scrap wood.

Water saving is also a priority, with 5 water butts for fruit and veg cultivation, shower usage timed and AA rated washing machine only run on full loads.

Lifestyle is equally important and careful use of heating only in occupied areas, plus moderate



thermostat setting means that consumption is around half the UK average.

Pauline and Alan had solar PV installed on the west and south faces of the bungalow a year ago and adjusted the way they use their "free" electricity accordingly

Energy and CO2 performance

Pauline and Alan switched to Ecotricity 15 months ago for gas and electricity to help promote the development of renewables.

Prior to installation of the solar PV system in March 2014, carbon emissions were already less than half the UK average. This is in part because Pauline and Alan spend 12 weeks of the year in Brittany.

The solar PV will help reduce carbon emissions still further to an estimated 63% of the UK average. It wasn't possible to quantify the savings in 2014 because the mains electricity meter wasn't changed and ran backwards when exporting to the grid! This resulted in exceptionally low bills, but now a new meter has been fitted it will be interesting to see what next year brings. Cost of gas was comparable to the previous year, despite the increase in price.

Energy efficiency measures

Heating and hot water

Heating, hot water and cooking is with gas. The bungalow already had a relatively new gas condensing boiler. When the hot water cylinder sprang a leak, Alan replaced it with a twin-coil cylinder which has the potential to connect to a solar system later.

Last summer, utilising the benefits from the solar panels, Alan placed a timer on the immersion heater to heat the hot water at periods of maximum generation (to try to save on gas).

The heating has a programmer, whole house thermostat and thermostatic radiator valves (TRV's) on all radiators, all of which have been replaced as each room has been decorated.

The 5kW wood-burning stove gives additional top-up heating as required.

The conservatory has underfloor heating connected to the gas heating system.

Insulation

Walls - cavity wall insulation is blown loose fill.

Windows - The entire building is doubled glazed with high performance heat reflective units. The porch has a double glazed outer door/window. The inner porch door has draught excluding tape around it.

Loft - 100mm of fibreglass quilt is laid under the floor and 100mm of fibreglass quilt above the plasterboard ceiling. In the section of loft which is used for storage, the roof has been insulated with 100mm quilt with a membrane stapled to the underside of the rafters to reduce draughts. Insulation has been topped up to a full 300mm of mineral wool, sharply cutting roof losses.

Airtightness & ventilation - Where floorboards have been stripped, gaps have been sealed with mastic. Inlet air for the wood-burner is ducted to a floor grille adjacent to the unit.

Renewables and low carbon technology

Solar PV – A 3kWp system, comprising 12 Solarworld PV panels using one Power One inverter, DC and AC isolators, Generation Meter and Wireless Monitor, was fitted in March 2014

Woodburning stove – installed by Alan and uses scrap wood from his renovation work.

Electricity

Alan and Pauline were gradually replacing old lamps, as they ceased working, with new low energy miniature fluorescent and LED ones. However, since helping out at TTW's new Energy Shop, they are now utilising that service and are replacing any that are not energy efficient.

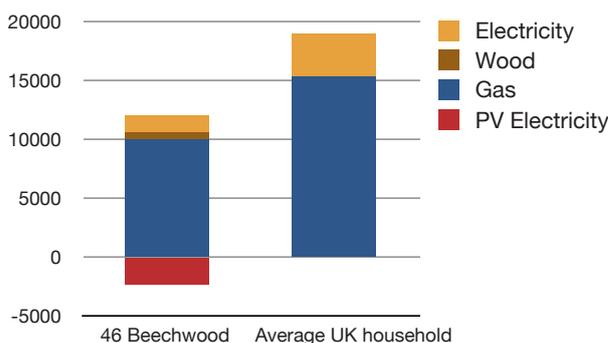
Appliances such as eco kettle and low energy shower are used.

Carbon emissions

Energy Use: Electricity 1650 kWh pa, Gas 9476 kWh pa, Wood 550 kWh pa, PV 1818 kWh pa.

Net CO2 emissions: Total 2.0 tonnes (63% less than average UK dwelling), 24.0 kg/m² (62% less than UK average).

Energy and generation (kWh)



Other sustainable measures/ lifestyle decisions

Clothes drying - This is done on washing lines in the conservatory, thus utilising the heat from the underfloor heating and the sun.

Water conservation - Savings on hot water are achieved by showering, washing up by hand (not using running water) once or twice a day and only using the AA washing machine on full loads. There are 5 water butts – 4 of them made from old mayonnaise/olive containers. No mains water has been used in the garden for the past 5 years.

Cooking methods - 2 day's meals can be cooked at once, using stainless steel saucepans with the lids on and turning them off about 5 minutes before the end of cooking time.

Food cultivation - Pauline grows her own vegetables and fruit.

Lessons learned/ Further improvements

Pauline and Alan's hot water use is minimal. They don't think it would be economically viable at present to have solar hot water.

When installing/repairing underfloor pipework it would have been sensible to insulate under the floorboards at the same time. This has been partially remedied by filling all the gaps between the boards with mastic.

Professionals

Double glazing and conservatory – www.anglianhome.co.uk/

Cavity wall insulation – www.downsenergy.co.uk/

Solar PV - Kingsley Eco Solutions, 50 Ferring Street, Ferring BN12 5JP, 01903 227726 – www.kingsleyecosolutions.co.uk

All other work done by Alan Cory

