

39 Downlands Avenue Worthing, BN14 9HD

Overview

Owners: Merry Curd and Richard Battson

Type: terraced

Age: built in 1930, recently eco refurbished

Beds: 3

Walls: Brick, cavity filled, solid wall insulation

Area: 95m²

Residents: 2 adults

Features

Cavity wall insulation

Condensing boiler

Food cultivation

Loft insulation

Low energy appliances

Low energy lighting

Natural Materials

Solar gain

Solar PV (3kWp)

Solar thermal

Solid wall insulation (internal and external)

Triple glazing

Wildlife garden and woodland



building biodiversity with their garden and woodland project, which is soon to include a "Hugelkulture" raised bed as part of a new permaculture design by Frances Osborn.

Energy efficiency measures

Heating and hot water

The house has a gas condensing boiler, with good programmer and thermostatic radiator valves. However, due the high level of insulation and relatively modest thermostat setting of 16o, gas use has been kept extraordinarily low. Heating can be boosted in colder weather by an open log fire or electric bar and convector fires.

This is assisted in part by the input from solar thermal panels for hot water, as well as solar heat gain in winter via the generous glazing on the south west facing rear wall.

Insulation

Cavity wall insulation – this consists of blown Superglass, comprising 84% recycled bottles, and was fitted free under the old CERT scheme at the end of 2012, by RSI Insulation.

Solid wall insulation – at the front this consists of 60mm of Pavadentro, compressed woodfibre insulation, fitted internally and finished with lime plaster. The rear was insulated using 80mm of Diffutherm woodfibre insulation on the outside walls and finished with a lime based render. Pavadentro and Diffutherm are natural breathable materials, which allow humidity in the house to self regulate and preserve a healthy environment. Final u values for the front and

Introduction and approach

This house demonstrates a deep commitment to sustainability, having been eco refurbished in 2012, with a specification drawn up by architects Ecotecture and the work implemented by Kithurst Builders, who are members of AECB, the sustainable building association.

The walls, windows and roof of this typical terraced house have been superinsulated to such an extent that heating losses have been cut to minimal levels, requiring very low gas and electricity consumption. In fact, with the offsetting input from renewables, solar thermal and solar PV, it has now become carbon negative, i.e. it offsets more carbon than it emits!

This approach goes well beyond energy conservation, as Richard and Merry have aimed to green all aspects of their lives via transport, food and recycling , as well as supporting and

back walls are a very low 0.27 and 0.24W/m²/K, respectively.

Triple glazing – all windows and the back doors have been replaced by new timber triple glazed units made in Bolton, which have extraordinarily low heat loss due to their u value of 0.86W/m²/K.

Loft insulation – the loft originally had 100mm of insulation between the ceiling joists. In the central boarded storage area, this has been increased to 300mm by adding two layers of 100mm x 50mm joists at right angles to one another and filling with Warmcell flakes, made from recycled newspaper. The eaves spaces were simply topped up to 300mm Warmcell, over the original joists. At the junction with the eaves, woodfibre insulation was run down between the rafters to prevent the Warmcell from blocking the eaves ventilation.

Renewables and low carbon technology

Solar Thermal – hot water comes from a flat array on the rear roof slope which was installed in 2007.

Solar PV – In November 2011 South Downs Solar fitted a 3 kWp group of high output hybrid panels, which maximise generation from the limited area available.

Electricity

Low energy lighting – all lamps throughout the house are CFL which use 80/90% less energy than conventional lights.

Appliances are low energy rating and high usage equipment is reserved for sunny weather to try and maximise output from the PV panels.

The energy supplier is Good Energy who were chosen because they promote low carbon energy from renewables.

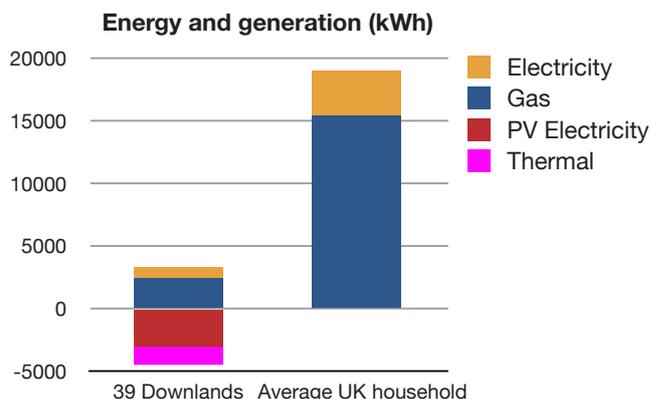
Carbon emissions

Energy Use: Electricity 900 kWh pa, Gas 2400 kWh pa, PV 3000 kWh pa.

Net CO² emissions: Total -0.4 tonnes (106% less than average UK dwelling), -4.0 kg/m² (107% less than UK average).

Other sustainable measures/ lifestyle decisions

Wildlife – The garden is a wildlife haven, with natural ponds and sympathetic planting to host native species. Various areas have been built up with internal cavities to aid overwintering by newts and other wildlife. At the rear is a small patch of abandoned land which was bought five years ago and is slowly being transformed into



natural woodland by growing native trees and shrubs. There is also a bee hive.

Recycling – Richard and Merry are committed to recycling, with nothing wasted and even the old windows reused as growing frames. In the house they aim to buy second hand rather than new and prolong the life of equipment as far as possible by repair rather than replacement.

Transport – the couple walk, cycle and use public transport as far as possible, with the car only used where no other option exists.

Natural materials – renovation work was done as far as possible using natural materials such as FSC wood, lime, woodfibre, Warmcell insulation, recycled glass cavity fill and a new cast iron soil pipe. This also extends to natural products for cleaning and washing.

Food cultivation / local produce / vegetarian – some food is cultivated, whilst the rest is local produce or fair trade. Being vegetarian is also a major contribution to a sustainable lifestyle.

Water conservation – rainwater is collected for use in the garden via linked water butts and bucketed upstairs for wc flushing!

Lessons learned

Although it was useful to have had advice from and the specification drafted by an architect, as the job progressed, the specification changed due to input from the builder and other factors. In effect, Richard ended up largely managing the project himself.

Professionals

Architect - www.ecotecture.co.uk/

Solar PV - www.southdownssolar.co.uk/

Triple glazing - www.greenbuildingstore.co.uk/page--ecoplus-natural-timber-windows-doors.html

Builder – www.kithurstbuilders.co.uk/

