CASE STUDY

39 Downlands Avenue Worthing, BN14 9HD

Overview

Owners: Merry Curd and Richard Battson

Type: terraced

Age: built in 1930, house recently eco refurbished

Beds: 3

Walls: Brick, cavity filled, solid wall insulation

Area: 95m^2

Residents: 2 adults

Key features

Rainwater garden/harvesting

Grey water recycling

Cavity and solid wall insulation

Triple glazing

Wildlife garden and woodland

Other features

Condensing boiler

Food cultivation

Loft insulation

Low energy appliances

Low energy lighting

Natural materials

Solar PV (3kWp)

Solar thermal

Introduction and approach

If you want to know how to live with water and energy consciousness, Richard and Merry's house is well worth a visit.

Some reasoning may not be obvious to start with, but speaking with them you start to understand how concerned they are about living at one with nature, conserving water and reducing their Co2.

They have a small, but efficient rainwater garden at the front, fed via an old beer keg and an extensive rain water harvesting system in the back that feeds three of the small ponds that are dotted around. They have buckets in place to capture all the water from their washing machine, kitchen sink, bath and upstairs basin, proving that grey water recycling can be super easy.

Their latest energy feature is an Apollo Gem Solar Power management system, which can direct surplus generated solar electricity to various uses in a sequence of priorities. The main advantage is that the hot water tank immersion heater is activated when free solar electricity is available.

Their house is triple glazed with wooden frames using natural materials wherever possible. Their whole house is very well insulated. As a result, they barely need any heating and keep the thermostat to a mere 16 degrees. Effectively their home is carbon neutral.

Their garden design is elegantly simple, working with nature, feeding the wildlife and letting it grow how it evolves. There is much to explore and learn about and you will be surprised to see how much is consciously thought about and how that works in tandem with the surroundings.

Energy efficiency measures

Heating and hot water

The house has a gas condensing boiler, with good programmer and thermostatic radiator valves. Due to the high level of insulation and relatively modest thermostat setting, 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 wood fibre insulation, fitted internally and finished with lime plaster. The rear was insulated using 80mm of Diffutherm wood fibre 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 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 tripled 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, wood fibre insulation was run down between the rafters to prevent the Warmcell from blocking the eaves ventilation.

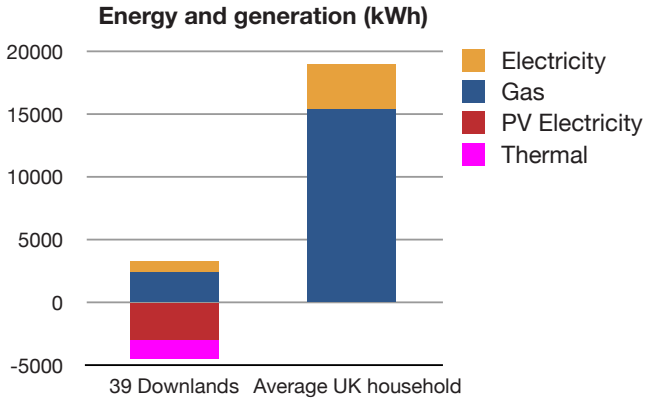
Renewables and low carbon technology

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 six years ago and is slowly being transformed into natural woodland by growing native trees and shrubs. There is also a bee hive. Their plans for this year include planting a hedge that they hope will be attractive to both people and wildlife to the north side of our garden and a shelter in the forest made with collected recycled materials.

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 cars only used where no other option exists. They made a conscious choice 4 years ago not to own a car any more.

Natural materials – renovation work was done as far as possible using natural materials such as FSC wood, lime, wood fibre, 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/

Solar power management system - www.apollosolarproducts.co.uk

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

Builder – www.kithurstbuilders.co.uk/