People Exploring Low Energy Homes

Knight’s Way, CB24 6DE

Nat and Mary-Ann – Nat says:

We bought our 1960's semi in June 2009. It was in a poor state of repair and we saw it as a great opportunity to start from scratch and put in **high-efficiency systems**. The three year plan includes major renovation and the addition of a **two-storey rear extension**.

I have a long-term interest in **sustainable building** and learnt a lot helping out with a number of off-grid self-build houses in California in the 1990s.

I hadn't thought that I would have the chance to put this experience into practice, but this house became available and presented the opportunity.

A particular focus of the project is to see what is possible within the **limitations of refurbishment**, as the style and construction of the house represents a **significant proportion of the UK's housing stock**. In many cases substantial improvements to efficiency were achieved simply by installing modern **energy efficient equipment**.

**Overview**

*Age, Type:* 1960s, Semi-detached

*Wall type, Floor area:* Cavity, 150 sq m

*Project timescale:* 3 yrs

*Cost of low energy measures:* £16,000

**Energy usage** – 2 adults, 1 child

20 kWh per sq m pa electricity (estimate)

100 kWh per sq m pa gas (estimate)

**Key features**

+ insulation: cavity walls, carbon zero, loft
+ insulation: thermal beam & block, extension floor
+ windows and doors: double-glazed
+ energy efficient systems
+ condensing boiler and radiators: A-rated
+ solar thermal system and thermal store
+ lighting: compact fluorescents, LEDs
+ rainwater harvesting
+ rainwater for toilets, clothes and gardening
+ low flush toilets
+ high-efficiency appliances
+ future: thermal store input from solid fuel source
+ future: large vegetable garden
+ Nat’s blog: [www.knightsway.blogspot.com](http://www.knightsway.blogspot.com)

**Low Energy Measures**

New **20 mm sealed-unit double-glazing** was installed throughout.

**Cavity wall insulation** had been installed by the previous owner but the loft was poorly insulated. **Carbon zero loft insulation** made from recycled plastic bags was installed in the loft. The new extension is heavily insulated in the cavity, roof and uses **Thermal beam and block** in the floor.

The existing hot-air heating system was removed and replaced with an **A-rated condensing boiler and radiators**.

The old, poorly insulated, hot water cylinder was replaced by a **thermal store** and a **solar thermal system** was added in June 2010.

The thermal store has one unused input, which could be used in the future for input from a **solid fuel source**.

**New windows and a new condensing boiler** are not explicitly eco-friendly or out of the ordinary, just built to newer standards.

**In other aspects simplicity was the focus**

The rewire avoided complex and energy-hungry lighting schemes with the **highest consumption in the long lounge-diner of 40W**.
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The refitted kitchen is lit by 8 LED lamps, totalling under 20W between them.

Current work
The extension is nearly complete. The new rainwater harvesting system has recently been commissioned and provides water for low flush toilets, clothes washing and garden watering.

Work for 2012 will focus on the garden, including the creation of a large vegetable patch.

Professional Contacts
Nat Johnson’s Blog: www.knightsway.blogspot.com
Builder: Jamie Beynon www.jbeynon.co.uk
Electrician: P. J. Deane
Solar Thermal: Envirosolar www.envirosolar.co.uk
Rainwater Harvesting: Combined Harvester www.combinedharvesters.co.uk

Products
Loft insulation: Earthwool carbon zero
Paints: Ecos Organic throughout.
Rainwater harvesting: Graf Platin 5000l tank, with pump and
Loft tank: bespoke, Combined Harvesters
Hot water and heating
Condensing boiler: Baxi Megaflo 18kW boiler. Gledhill Torrent RE
Solar thermal store: 277l 30 Thermomax
Solar thermal evacuated tubes: Deltasol control and pumps.

Lighting
Compact fluorescent: throughout, except kitchen
LED lamps: in the kitchen