

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**.

### 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**.

### 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)

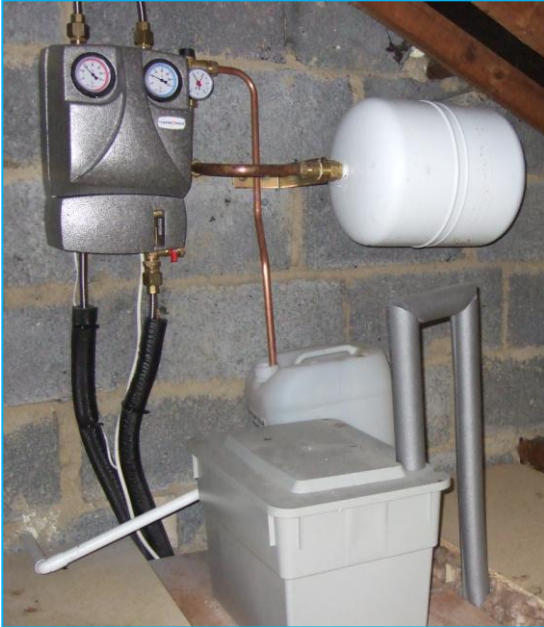
**100 kWh** per sq m pa gas (estimate)

### 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)

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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](http://www.knightsway.blogspot.com)

**Builder:** Jamie Beynon  
[www.jbeynon.co.uk](http://www.jbeynon.co.uk)

**Electrician:** P. J. Deane

**Solar Thermal:** Envirosolar [www.envirosolar.co.uk](http://www.envirosolar.co.uk)

**Rainwater Harvesting:** Combined Harvester  
[www.combinedharvesters.co.uk](http://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