

Topcliffe Way - CB1 8SJ

Modern retrofit of 1960's house incorporating DIY and low-cost solutions

Meet your hosts, Rob and Anne

The Leedhams bought their house in 2000; Rob is an electronics design engineer, and Anne a biologist. They've since created a low-carbon home for themselves and their two children.

Rob says: 'Our aim was to lower the family's carbon footprint. I started measuring the gas and electricity we used, and decided to take control rather than ignore it. I identified each significant energy use, and researched how to reduce it.'

Most of the insulation and airtightness work has been DIY, which I've enjoyed doing – it's practical work making a nice contrast to my day job'

Insulation

'Big' insulation works: The cavity wall was insulated in 2005 using blown glass wool. We've insulated the loft in stages, with Celotex overhead, and glasswool, XPS (extruded polystyrene), Celotex and boarding underfoot.

For the perimeter wall insulation there was lots of digging by hand! I put in foamglass from the damp proof course to the top of the foundations footers – around 800mm deep, 100mm thick.

Low-cost insulation: We poured in polystyrene insulation beads behind the (already insulated) hot water tank and sealed them in for extra insulation.

I used a panel of Aerogel on one external door to thermally improve a flimsy wooden panel, and a can of squirry foam. Plus draughtproofing to get the air infiltration down from 6 air changes per hour to 2.7 – I measured this with a DIY airtesting device made from an old car radiator fan (pictured right).

Glazing

When we bought the house it had uPVC windows throughout which are now 25 years old. I replaced the glass units with new Argon fill, warm edge units with a U_w value of 1.1. It was surprisingly easy; the hardest part was measuring!

Lighting and appliances

We replaced all the traditional lightbulbs with CFLs, and are slowly replacing them with warm LED. We've replaced white goods and TV as needed the most energy-efficient models, and use PC 'standby busters' and auto switch-off for the DVD and Wii.



Topcliffe Way - CB1 8SJ

Modern retrofit of 1960's house incorporating DIY and low-cost solutions

Heating and renewables

We've installed a new condensing boiler, retaining the original 1963 radiators and pipes. We had a woodburning stove fitted professionally.

The DIY-fitted mechanical ventilation heat recovery (MVHR) unit in the loft keeps the house comfortable. The ducting is mainly in the loft, with a few vents throughout the house for distribution.

A solar thermal system, fitted DIY, provides hot water for 5 months of the year. In 2013 we had a PV system fitted – it generates around 3500kWh/year electricity.

Water management

We harvest rainwater for gardening – or more likely kids' water fights! The greywater system routes all shower water into the downstairs toilet cistern. The very large cistern (see photo) holds around 50 litres of water, so doesn't run out – and its use is entirely 'free'. Every few weeks I drop in a chlorine tablet to keep it clean-smelling.



Performance

The MVHR works silently and perfectly – it's an unsung hero allowing indoor clothes-drying, so avoiding the need for a tumble dryer, and giving fresh air whatever the weather. It automatically increases speed if it's humid, or there's a higher carbon dioxide level from gas cooking or lots of people in the house.

The perimeter wall insulation makes the floor much warmer in winter, so it's now much more comfortable, especially as we often walk about barefoot.

The solar thermal system had quite a few teething problems, largely as it was DIY and I forgot some verbal advice I'd been given by a plumber. It was fine in the end though!

Future plans

Maybe insulating the garage with an 'inverted roof' approach (insulating layer above the waterproofing layer), and improving the windows and lintels. Also possibly insulating the top of the cavity wall.

www.openecohomes.org

Topcliffe Way, CB1 8SJ – 2017

Open Eco Homes is a Cambridge Carbon Footprint project. Charity number 1127376

Date built: 1963 **Type:** Detached
Wall type: Cavity wall
Floor area: 120 m²
Cost of retrofit: £20k
Occupants: 2 adults, 2 children

	Energy kWh/m ² /yr		Carbon kg CO ₂ /yr		Water m ³ /yr
	Elec	Gas	/m ²	/person	
Before	33.3	175	49.8	1494	110
After	16.7	58.3	20	599	60

Key features

Insulation

Cavity wall insulation

DIY insulation works:

- External wall
- Loft
- Hot water tank
- Door

Glazing

DIY double-glazing

Heating/energy

Condensing boiler

Woodburning stove

Mechanical ventilation heat recovery system

DIY solar thermal system for hot water

Solar PV

Lighting/appliances

LED lighting throughout

Key contacts and products

Solar PV system - [Navitron](#) £6,5k

Woodburning stove - [Anglia](#) £3k

MVHR - from [Dealec](#) £1.4k

Ducting – from [isells.co.uk](#)

Solar thermal system - from [Navitron](#) £1.5k

Hot water tank for system - from [Navitron](#) £500

[Celotex](#) – from ebay £400

[Aerogel](#) – ebay (small quantities) £50

[Foamglas](#) - £400

