

People Exploring Low Energy Homes

**Colin Harris** – Colin says:

I bought an ‘Airey’ house in Coton in 2010, choosing the village because of the lovely cycle ride to Cambridge! The house had been refurbished, but major issues remained. I decided to start anew, and design a more sustainable home.

After the initial shock that planning required two houses to be built on the plot rather than one – for efficient use of land – I realised this could meet both my home and business premises needs. I thus designed a “semi-detached”, with a separate ground floor office in one of the “semis”, while the upper floors remain interconnected for living space as a single residence.



The timber frame design allows easy conversion into two independent units in the future. The planners liked the concept because it met sustainability criteria (eg. energy efficiency, journey to work, efficient use of land) and also enhanced both business activity and long-term housing stock for the village.

The design was developed in close collaboration with Scandia Hus (structural, building regs and CAD) and my sister Yvonne Thompson, who previously worked as an architect and is now a Sustainable Design Consultant. Friends played a key part with their design ideas!

**Sustainability Measures**

My aim was to achieve a **practical, low-maintenance, comfortable home** that was as sustainable as possible at an affordable cost! The simple design helped minimise construction costs, although extra investment was made in energy efficiency: **factory engineered timber frame construction, high-spec insulation, low U value glazing, large windows for passive solar gain.**

The design achieved a **SAP rating of 92 (A Band)**. **Alu-clad triple-glazed timber windows and Western Red Cedar cladding** are designed for longevity. My aim to source **all timber from sustainably managed forests** was achieved except that, frustratingly, the plywood subfloor was incorrectly supplied as only 70% FSC. The **oak floor** was not FSC, although the supplier provided evidence the timber was from sustainably managed European forests.

**External walls are 300 mm thick**, combining an **outer skin of block & render with an inner timber frame holding insulation** of 100 mm celotex / 50 mm rockwool. At ground level, 100 mm celotex and 70 mm screed is laid over a **beam & block foundation**, while 200 mm celotex is installed in

<b>Overview</b>
Age, Type: <b>2013, Custom built, Detached</b>
Wall type, Floor area: <b>Timber frame, block / render and cedar, 300 m<sup>2</sup></b>
Project timescale: <b>Planning 2 yrs, Building 10 mths</b>
Cost of build: <b>£TBC at Open Eco Homes</b>
<b>Energy usage</b>
SAP (design) – 92 (Band A). Actual not yet known
<b>Key features</b>
+ celotex & rockwool insulation
+ 92% efficient gas boiler
+ hot water cylinder (options for solar PV & thermal / heat pump / pellet)
+ double glazed bi-fold doors (FSC)
+ triple glazed windows
+ underfloor heating
+ solar PV
+ cedar cladding (PEFC)
+ heat recovery ventilation system
+ dual flush toilets
+ water butts
+ water efficient softener
+ LED lights
+ energy efficient appliances
+ engineered oak floors (sustainable source)



the roof. Intermediate floors have 190 mm of rockwool laid between joists.

Roof-integrated **solar PV panels** (3.8kW) and energy efficient **heat recovery and ventilation systems** are installed. Simple **water butts** are included, although rainwater harvesting exceeded the budget.

The decision to heat water by **conventional gas boilers** was driven by budget and site practicalities. The **hot water cylinders are future proofed** by triple inputs: gas (or heat pump or pellet burner), solar thermal and electric (PV) immersion. For now, I am using gas and PV. By investing in measures to **minimise thermal losses**, gas consumption should be low. In the future, solar thermal and perhaps heat pumps may be adopted.

**LED lighting** was costly to install, although will repay itself long-term. It was hard to find good information on LED, and the technology is changing rapidly. It seems likely LED will soon be the norm. All electricity is supplied by either the **solar panels** or the grid by a **100 % green tariff supplier**.

## Professional Contacts

**Architectural design:** Owner, with design advice from Scandia Hus and Yvonne Thompson (B.Arch), Director, Ecotru Design Ltd, New Zealand: [www.ecotrue.co.nz](http://www.ecotrue.co.nz)

**Timber frame & Structural Engineer:** Scandia Hus Ltd. Cameron McMillan 01342 838 064 (cm@scandia-hus.co.uk) [www.scandia-hus.co.uk](http://www.scandia-hus.co.uk)

**Builder:** Brian Sewell, Darren Sewell: Southlands Properties, Haslingfield. 01223 872 097

**Electrician:** Treadaway Electrical Services Ltd. [www.treadawayelectrical.com](http://www.treadawayelectrical.com)

**Plumber:** Derek Hales Ltd [www.derekhales.co.uk](http://www.derekhales.co.uk)

**Heating services (u/floor heating):** Derek Hales / UFW [www.ufw.co.uk](http://www.ufw.co.uk)

**Fitted Kitchen:** Selin Beeston, John Lewis [fitted\\_kitchens\\_cambridge@johnlewis.com](mailto:fitted_kitchens_cambridge@johnlewis.com)

## Products and Costs

**Insulation:** Celotex, Rockwool

**Western Red Cedar:** Silva Timber [www.silvatimber.co.uk](http://www.silvatimber.co.uk)

### Windows and doors

**Timber sliding doors:** Kloeber [www.kloeber.co.uk](http://www.kloeber.co.uk)

**Roof lights:** Velux [www.velux.co.uk](http://www.velux.co.uk)

**Windows:** Rationel Aura Plus alu-clad triple-glazed (Uw 0.7 - 1.0) [www.rationel.co.uk](http://www.rationel.co.uk)

**Doors:** XL Joinery, [www.xljoinery.com](http://www.xljoinery.com)

**Underfloor heating:** Polypipe [www.polypipe.com](http://www.polypipe.com)

**Ventilation:** Villavent/SystemAir [www.systemair.co.uk](http://www.systemair.co.uk)

### Light

**Lighting design:** John Stevens, Lighting Sensations, Haslingfield, [www.lightingsensations.co.uk](http://www.lightingsensations.co.uk)

### Energy

**Gas boiler:** underfloor heating and domestic hot water, Worcester-Bosch, [www.worcester-bosch.co.uk](http://www.worcester-bosch.co.uk)

**Hot water cylinder:** Gledhill Stainless Light [www.gledhill.co.uk](http://www.gledhill.co.uk)

**Solar:** Scheuten roof integrated PV / Eltek inverters [www.midsummersolar.co.uk](http://www.midsummersolar.co.uk)

**Energy efficiency technical advice:** Daniel Jones, Redcotec [www.redcotec.co.uk](http://www.redcotec.co.uk)

### Floors & Worktop

**Engineered oak:** Barham & Sons, 190 mm x 20 mm boards (sustainable source) [www.barhams.biz](http://www.barhams.biz)

**Stone tiles:** 'White fossil' limestone, Jerusalem Stone [www.jerusalemstoneuk.co.uk](http://www.jerusalemstoneuk.co.uk)

**Granite worktop:** Blue Pearl, StoneTime, Bottisham: Roz Eadon 01223 811 111 [www.stonetime.co.uk](http://www.stonetime.co.uk)

### Paints

**External & Internal:** Water-based low VOC-emulsions

### Water

**Water softener:** Harvey, AD Veale [www.adveale.co.uk](http://www.adveale.co.uk)