

People Exploring Low Energy Homes

Silverdale Avenue, CB23 7PP

Colin:

'I bought an 'Airey' house in Coton in 2010, choosing the village because of the lovely cycle ride to Cambridge! The house had 'issues' so 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 needs. I thus designed a 'semi-detached', with a separate ground floor home office in one of the 'semis', while the upper floors remain interconnected for living space as a single residence.'



Overview

Age: 2013-4 **Type:** Custom-built, detached
Wall type: Timber frame, block with render & cedar
Floor area: 250 m²
Project timescale: Planning 2 years, building 1 year
Cost of build: To be confirmed at Open Eco Homes
Occupants: 3

Energy consumption		Carbon emissions	
kWh/m ² /yr		kgCO ₂ /yr	
Elec	Gas	/m ²	/person
14.8	71.8	21.5	896

Insulation

Internal wall insulation (held in timber frame)
 Roof insulation
 Ground floor insulation
 Interfloor insulation

Glazing

High performance triple-glazed

Heating/energy

Solar PV: 3.8kW system integrated in roof
 Boiler: 92% efficient gas
 Underfloor heating
 Heat recovery ventilation system
 Passive solar gain
 LED lighting and energy-efficient appliances (eg A+++ rated fridge)

Water

Dual flush toilets
 Water butt
 Water softener

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 timber frame design allows easy conversion into two residential units in the future. The planners liked this because it met sustainability criteria (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 also played a vital part with their design ideas!

The design achieved a SAP rating of 92 (A Band), although the final rating was 89.

Construction and materials

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 sourced 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 the roof. Intermediate floors have Rockwool laid between joists. Alu-clad triple-glazed timber windows and Western Red Cedar cladding were installed for longevity.

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Heating/energy

Roof-integrated solar PV panels (3.8kW) and energy efficient heat recovery and ventilation systems are installed. A simple water butt gathers water; rainwater harvesting tanks and greywater recycling exceeded the budget.



The decision to heat water by 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. By investing in measures to minimize thermal losses, gas consumption is low. In the future, solar thermal and perhaps heat pumps may be adopted.

Lighting

LED lighting was costly but will pay for itself long-term. It was hard to find good information on LED; technology is changing, and prices falling rapidly. The light quality is excellent, and it is likely LED will soon be the norm. Electricity from the grid is on a green tariff supplemented by the solar panels.

Best eco investments

Timber frame structure, insulation, UFH, triple glazing, solar panels, LED lighting.

Future plans

Landscaping the garden. Solar thermal.

Professional Contacts

Architectural design: Owner, with design advice from Scandia Hus and Yvonne Thompson (B.Arch), Director, [Ecotruie Design Ltd](#), New Zealand

Timber frame & Structural Engineer: [Scandia Hus Ltd](#) Swedish energy-saving homes: Cameron McMillan 01342 838 064 (cm@scandia-hus.co.uk)

Electrician: [Treadaway Electrical Services Ltd](#)

Plumber & underfloor heating): Martin Goodenough of [Derek Hales Ltd](#)

Tiling: Daniel Bavister, Huntingdon 07891 396993, and Dan Higgins 07969 826289

Fitted Kitchen: [John Lewis](#), contact Selin Beeston

Products and costs

External wall cladding

Western Red Cedar [Silva Timber](#)

Insulation

Internal walls & roof: [Celotex](#)

Walls & interfloor: [Rockwool](#)

Doors and windows

Doors: [XL Joinery](#)

Timber sliding doors: [Kloeber](#)

Roof lights: [Velux](#)

Windows: [Rationel](#) Aura Plus alu-clad triple-glazed U-value 0.7-1

Heating/energy/ventilation

Gas boiler: underfloor heating and domestic hot water, [Worcester-Bosch](#)

Hot water cylinder: Gledhill Stainless Light [Gledhill](#)

Underfloor heating: [Polypipe](#)

Ventilation: SystemAir from [Villavent](#)

Solar: [Scheuten](#) roof integrated PV/[Eltek](#) inverters supplied & installed by [Midsummer Energy](#)

Energy efficiency technical advice: Daniel Jones, [Redcotec](#)

Other

Floors (engineered oak): [Barham & Sons](#), 190 mm x 20 mm boards (sustainable source)

Granite worktop: Blue Pearl, [StoneTime](#), Bottisham: Roz Eadon 01223 811 111

Paints (external & internal): Water-based low VOC-emulsions

Lighting design: John Stevens, [Lighting Sensations](#), Haslingfield

Water softener: Harvey at [AD Veale](#)