

People Exploring Low Energy Homes

Gilbert Rd, CB4 3PE

Neil and Catherine

Neil says: 'We moved here in October 2008. I have never been so cold as I was that first winter. The house leaked heat in every direction. In midwinter, the central heating system took eight hours to heat the house up to 17°C. It was unable to maintain any higher temperature against outside temperatures around freezing.'

Something had to be done. Inspired by Anne Cooper's earlier projects, we retained AC Architects to work on energy-efficiency and insulation improvements. This expanded to providing more room in the house and better-organised living space.'

Overview

Age: Built 1930 **Type:** Semi-detached

Original walls: Solid brick.

Floor area (after extension): 150m²

Project timescale: 18 months planning, build time 8 months

Cost of build: Full extension £150,000; £12,000 insulation and solar water heating only

Occupants: 3

	Energy kWh/m ² /yr		Carbon kgCO ₂ /yr	
	Elec	Gas	/m ²	/person
Before	33	150	53	1762
After	19	60	29	975

Key features

Insulation

External wall insulation

Internal wall insulation – thermal mass

Loft insulation

Underfloor insulation in extension

Thermal lined curtains and blinds

Glazing

Double-glazing on all new windows

Secondary glazing on other windows

Heating

Solar water heating

Woodburner

Water

Rainwater recycling



The Building Process

The solid brick walls lost heat rapidly. They had no cavity. The solution was to insulate on the inside. The rooms that had particular problems were the two large front rooms, which have external walls on three sides. The north-west wall became an internal wall after the extension work. The other two walls required internal insulation. Insulation was also added to the inside of the front wall in the ground-floor hallway and to the inside of the existing back wall in the third bedroom. We chose not to insulate the back wall of the second bedroom as there is little exposed wall in this room: most of the wall is taken up by window or abuts the rear extension's roof space.

Low Energy Measures

Insulation: The insulation comprises Celotex, with a studwork frame in front to hold plasterboard. The curved wall in the living room required an imaginative alternative: an insulation board that had the insulation already attached to plasterboard was carefully cut to allow the plasterboard to bend to fit the curve. This was then plastered to make a smoothly curved surface, with the old curved radiator reinstalled.

Solar water heating: We installed a solar water heating system. The water tank provides main's pressure hot water to the house. It has two coils: the lower coil heats the entire cylinder with solar-generated heat. The



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upper coil heats only the top half of the cylinder from the gas boiler. On sunny winter days, the solar system gets the water up from 0°C to about 30°C, with an hour's worth of gas heating, in the evening, raising this to 55°C. In summer, only solar heating is needed.

Rainwater recycling: We installed two small (200 litres each) water butts for garden water. We considered installing a much larger (thousands of litres) water tank underground in the back garden, which would have supplied rainwater to toilets and washing machine. We chose not to do this, owing to the expense both of the tank and of digging the hole. Unfortunately, this is something that cannot be retrofitted easily, as it requires a third set of water pipes running throughout the house in addition to hot and cold mains.



Performance

The house is much warmer and much faster to heat, and stays warm for much longer. Our gas consumption has gone down by almost 60% per square metre and our electricity consumption has gone down by just over 40%.

Before renovation, in midwinter, the living room took all day (eight hours) to heat up to a reasonable temperature. After renovation, in mid-winter, this room requires only one hour's heating *from the same radiator* to heat up to that reasonable temperature.

We are able to turn off the gas water heating for three months in the summer and rely entirely on the solar water heating for those summer months. For the rest of

the year, the solar water heating provides about half the heat needed for the water.



Future Plans

With regard to lifestyle, we are considering getting rid of our car, or providing a space for a car-sharing scheme. We have no plans to change the house further. The building project was three projects in one (insulate existing house, side extension, rear extension) and the house is now as we want it.

Professional Contacts

Architect: [AC Architects Cambridge Ltd](#), 01223 576315

Structural Engineer: [Andrew Firebrace Partnership](#), 01223 811572

Builder: [R W Dixon and Son Builders](#) 01284 767326

Loft insulation: [Aran Services Ltd](#) 0800 587 7795

Products and Costs

All suppliers were subcontracted by the builders, so we have no personal experience of any of them.

External solid wall insulation: 75mm thick Celotex tuff-R zero GA3000Z series insulation board. Cost (two large rooms) c £1000 including labour and VAT, plus cost of electrician to rewire the power and light switches on the treated walls.

Insulation of loft space: £250.

Solar water heating system and new hot water cylinder were supplied and fitted by [Solarworks](#) 0800 781 4004