

Victorian Family Home with 21st Century Insulation

Meet your hosts: Zoe & Samin

We are a family of four: two adults and two teenage children. We also have two cats. As a family, we wanted a home that had light, space, comfort and warmth. We wanted a space that worked for all of us but also minimized our carbon footprint and waste. And a home in which we could entertain, cook for, and accommodate our friends and family, knowing that they would be comfortable.

We bought the house in 2005. For a decade, we were freezing in the winter, and too hot in the summer. There were certain parts of the house that we didn't use because of the cold and damp. We gave up turning on the radiators as the heat would just escape out of the uninsulated roof, windows and walls (our main living area at this point was heated by a wood burner). We wanted to fix all these issues as well as the "boggles" inflicted on the house by previous owners.

We knew that the cost would be high; but it was important to us that the house was renovated to the highest possible standard. Even though some of the payback periods were over 20 years, we wanted to future-proof the house: ecologically, economically, and as a place to live in comfort for the long term.

The Renovation Process

During 2014-15 we went to workshops at Cambridge Carbon Footprint, and, through Open Eco Homes and SuperHomes, visited local eco-renovated homes. We employed AC Architects, and it then took two years of planning with them – detailed technical reports, eco renovation discussions, family time preventing quick replies – before the work started. AC recommended several builders to us: we chose RWD. RWD understood what we were setting out to do, and they already had a good working relationship with AC.

AC project-managed the renovation but we were extensively involved, both formally in fortnightly meetings, and on many other matters, such as arranging utility meter changes, choosing fixtures/fittings and so on. The work was so extensive that we moved out of the house for eight months (July 2017 – Feb 2018). We moved back in when only some external work remained; the work was finished in April 2018.

The renovation was very successful. The house feels airtight and quiet. We now have much greater comfort throughout the house, more light, and lower heating bills (despite now heating more of the house, more of the time). We don't use our wood burner as the main heating source anymore. The solar PV meets electricity demand from the house first, then heats water, then goes out to the grid. (We have had feed-in tariff payments back from the grid every quarter.) The cats have gained comfort but lost their cat-flap; they have to wait to be let out, and they have a litter tray indoors. Some members of the family previously needed to wear onesies in the winter; they don't any more. Oxfam also benefited: moving house twice in eight months meant we gave away a lot of unwanted goods – twice.



www.openecohomes.org

Victorian Family Home with 21st Century Insulation, Cambridge – 2020

Open Eco Homes is a [Cambridge Carbon Footprint](#) project. Charity number 1127376





A Whole House Approach

We combined our eco-renovation with other substantial improvements the house needed. These included installing new pressurized hot water, foul water drainage, and gas heating systems; a new kitchen (the old one didn't survive garden storage over the winter) and bike storage. We brought more light into the house by introducing new roof lights into the living/kitchen area and a new window by the front door.

We created more storage on the ground floor and in the loft by removing old and inefficient ways of heating the space and water in these areas. We also took the gas and electricity meters, and the water stopcock to the outside of the house.

Information

The best sources of information were our architects and builders, Cambridge Carbon Footprint workshops, Open Eco Homes and SuperHomes hosts, and the internet. Talking to everyone involved in the project (solar PV engineer, gas grid surveyors, and so on) was also incredibly useful and informative.

Performance

We are very happy with the result. There wasn't much we would have done differently. We could have done it earlier, but we didn't have the guts to do it until now.

Our top tips: Think big, push through, ask for help. And: Insulate!

Key Contacts, Products & Advice:

Architect: [AC Architects](#)

Builder: [RWD Builders Ltd](#)

Bathroom: [Ridgeons](#)

Bike Rack: [The Bike Storage Company](#)

Hot water system & Solar PV: [Solarworks](#) including pressurised hot water tank from [Newark Copper Cylinder](#)

Kitchen: [Howdens](#)

Rooflights: [Velux](#)

Windows & Doors: [Valdi](#)

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Key Specifications:

Property age: Late Victorian

Type: Terraced House

Wall type: Solid wall

Floor area: 167m²

Cost of Retrofit: £235k including new kitchen & all improvements

Occupants: 2 adults, 2 children, 2 cats

Insulation & Glazing

- External front/rear walls (PIR) Kingspan Kooltherm K5 External Wall Board - 0.17 W/m²K
- Internal insulation to sides: Dining area, pantry & bedroom 3 using PIR Celotex GA4000 - 0.18 W/m²K
- Internal insulation to side external walls in kitchen/landing/ stair using Thermablok Aerogel Thermaslim IWI board - 0.32 W/m²K
- Roof external insulation: PIR between & over rafters using Celotex - 0.16 W/m²K
- Ground floor: insulated concrete slab using Celotex K11 with underfloor heating throughout - 0.16 W/m²K
- New triple glazed windows - 0.8 W/m²K
- Velux triple glazed rooflights - 1.0 W/m²K
- New high spec insulated doors

Heating & Energy

- A+ rated appliances: fridge, WM, dishwasher; low energy lightbulbs
- A rated Ideal Logic+ H18 Condensing Gas boiler
- Sunpower 4 kW PV array
- Iboost diverts excess solar energy to immersion heater
- Honeywell Evohome-controlled wireless radiator valves
- Jotul F530 8kW Wood burning stove (now rarely used)
- Electricity & gas supplied by [Bulb](#)

	Energy kWh/m ² /year		Carbon KgCO ₂ /year	
	Electricity	Gas	/m ²	/person
Before	14.9	43	11.7	489
After	12	37.9	10	419

Water management

- Water butts; low volume toilet flush

Materials

- Recycled slate for new roof tiles
- All wood from the demolition/build saved for garden & allotment projects
- Re-use where-ever possible: white goods, floorboards, bathroom fixtures & fittings

