

F-rated home to near Passivhaus Standard: CB6



Property overview

Property age: 1968. EPC: F

Type: Detached chalet bungalow

Wall type: Cavity Wall

Floor area: 118m²

Cost of Retrofit: £58,251 so far

Occupants: 2 adults, 2 children, 2 dogs

Blog: <https://hillrow.blogspot.com/>

Meet your hosts: Rachel & Jake

We both enjoy the outdoors. Jake previously worked in construction and Rachel works as a CSR manager for a construction company. This meant that we have been aware of Passivhaus standards for some time. In addition, Jake has been able to do a great deal of the build himself, including hand cutting the roof, for the first time ever! Jake's boys, Christopher and Ryan have also been helping with the renovations (aged 13 and 15).

Before we began the retrofit, the house had an EPC F-rating. We wanted to create a comfortable, sustainable home and were keen to retrofit as near as possible to Passivhaus standards as we plan to live here in the long term. We bought the home in Oct 2020 and are in the process of completing the retrofit.

The Renovation Process

An architectural technologist drew plans to our specification, and a structural engineer worked out calculations for steels for a new roof. This caused a 3-month delay, so we spent the time tackling the overgrown garden and orchard.

When the building control application was approved (Dec 2020), we removed the old roof and chimney ready for the new steels. We turned the house upside down, moving the bedrooms downstairs and making the upstairs an open plan living area with solar gain from a large south facing window and no windows on the north side. We removed half the roof, extended the flat roof dormer to a sloping one and replaced it with one large sliding window.

We dug out the floor in the front of the house to 600mm, removed old hardcore and replaced this with crushed stone, concrete and insulation. The rear of the house was already dug out and replaced with block and beam before occupation (this was to satisfy the mortgage company as the floors had subsided).

We chose sustainable credentials over style for the large 3 panel sliding window. And we had to lose some height in the shower for the MVHR ducting (100mm). One downside to moving out of Cambridge is that I am unable to cycle as much and need to use the car more. But we have factored in a car charging port and hope to have an electric car in the future.

www.openecohomes.org

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



Financing and payback period

We knew money would be tight and hoped we could earn the money as we went, saving through DIY or with help from family and friends. We received £5k from the Green Homes Grant and a local council grant and received £906 by recycling all the metal we found in the house. With the grants the air source heat pump (ASHP), with underfloor heating manifold, tank and buffer tanks, cost us £5000.

A lot of the work (windows and heating system) needed doing regardless as we were not replacing a working system. In our previous 2 bed terraced house, we spent around £732 on energy/year. The costs would have been much higher in this house (draughty, single glazed, inefficient oil boiler). ASHP would be expensive to run without solar panels so we combined the two. Solar panels with battery cost £6K for 80% of our electricity use.

We believe we can source wood for the stove for free, mainly from the garden for the first years, and the window bill was reduced with some non-opening windows (where permitted) as we were installing an MVHR. We hope that a co-benefit will be that the MVHR will help filter pollen and pollutants as three of the four of us suffer from asthma and hay fever.

Performance

The biggest differences we found were from insulation and draft-proofing. By sealing up the letterbox and holes in rotten windows, and stuffing insulation where we could the house got much warmer before even starting the big changes. Even without central heating, the house is much warmer and quieter.

We feel really pleased about the work so far and feel we have made the right decisions. As it is still a work-in-progress, we will wait a year to see the impact of the work on performance, however we have no doubt that the renovations will perform as we anticipate.

Key contacts, products and advice

Our renovation blog: <https://hillrow.blogspot.com/>

Architectural Technologist: Simon Ward (01480 301018)

Structural Engineer: [Gawn Associates](#)

Steelwork: [Keith Collier Engineering](#)

Plumber (ASHP): [Clarity Heating](#)

Electrician: [JSL Electrical Services](#)

Stove and flue: [Stovefitters warehouse](#)

Windows, doors, MVHR, Airtightness membrane, tapes & gunge: [Green Building Store](#)

Screed: [Liquid Screed Pumping](#)

Cedral cladding: [AJW distribution](#)

Concrete: [Cardinalis](#)

Timber, Insulation: [Gibbs and Dandy](#), [Jewson](#), [Ridgeons](#)

Costs and full contact details available on request



Key specifications

Insulation & Glazing

- Roof: 175mm PIR insulation, Floor: 100mm.
- Replaced cavity wall insulation.
- Airtight membrane & airtightness measures throughout house.
- Triple glazed timber windows, U=0.8.
- New doors.

Heating & Energy

- Rewired entire house.
- 5KW Panasonic air source heat pump.
- Joule Cylinder for hot water.
- Underfloor heating downstairs.
- Individual thermostats in each room.
- MVHR throughout house.
- DEFRA compliant wood burning stove with external air source.
- 5.1 kW solar PV with battery in attic.

Materials

- Recycled building materials where possible e.g. roof tiles, cleaned recovered bricks.

Garden and natural systems

- Vegetable garden & renewed old orchard.

Lifestyle changes

- During the retrofit we made do without heating all winter and used bath water to flush toilet!

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