A whole house approach to a 1960s retrofit: CB24

Property overview

Property age: 1962
Type: Detached
Wall type: Cavity wall
Floor area: 137m²
Project Timescale: 2012-present (ongoing)
Cost of Build: £160k
Occupants: 3 adults, 1 child

Meet your hosts: Shaun & Fran

I (Shaun) have been in the technology industry all my life and am currently Head of Technology in a housing association. Fran was initially in science and business analysis but moved to her passion of social care, currently working as a Teaching Assistant. Community and family are important to us, and we both became special guardians for a vulnerable child. We believe that home is somewhere that should be a healthy place to be and make people feel safe and comfortable.

We bought the house in 2011. Family health has always been a goal of mine. I wanted to make our home modern and comfortable, but without all the pitfalls like extra energy demands. I have a view to being more self-sufficient and not so reliant on the public supply systems (water and energy). We consider this an investment and wanted to demonstrate to our children that you don't just talk about things, you action them.

Financing, Design and Construction

Financial considerations were very important to us, but we did not calculate payback times. We took on each part as finances become available and made the most of appropriate grants (e.g. Renewal Heat Incentive for the solar hot water). We self-financed the project with some savings and an extra mortgage.

The project has taken several years and been completed in stages, part DIY and partly with local builder Matt Salmon. I designed the changes myself, submitted the plans for approval, then checked with engineers and hired M J Salmon Builders to project manage. We ripped out the entire house - and I mean entire: stairs out, floors out, walls out…to the shell - rebuilt the lot. This enabled us to tackle everything together, for example enabling us to route air pipes for the MVHR system (Mechanical Ventilation with Heat Recovery).

Home-energy improvements

Insulation: We insulated the whole house including solid underfloor insulation, solid reflective insulation within new cavity walls and behind concrete barge walls on the front of the house and rock wool within the remaining cavity walls. The attic floor and rafters were insulated with boards over it for access, making the roof space semi-warm without any extra heating.

Heating: We have very low heating demand. The MVHR unit means that cooking now heats the entire house. In addition, MVHR removes excess moisture, pollen and dust and ensures a regulated supply of fresh air, improving air quality and enabling us to have a drying room for wet clothes. We make the most of our solar thermal collector by staggering showers and, when we do need some extra heat or hot water, we have installed a very efficient boiler.

Renewable Electricity: We have a 4 kW Solar PV roof system installed under the 'rent roof' system. A Shade Greener installed this for free and, while they earn the Feed-in-tariff payments, we get the free electricity. Most of our electricity use is during the day, including use for home working, and we charge our two electric cars (BEVs) off the solar panels.

Garden: We have PV in the garden powering various battery powered garden tools, including a 37c lawnmower and strimmer. I re-used materials from the construction process to build raised beds and lean-to greenhouse and built a gravel heat store underneath this with a warm air vent to provide heat in winter.

Performance

We are very proud of our home-energy improvements. We felt we were mainly investing in a style and quality of living, so the financial benefits were secondary, but we were surprised by quite how good they were!

In terms of any compromises: we've made: solar hot water maintenance is more than expected and, we wouldn't install those again; the loft space is reduced due to loft insulation and access is required for all the kit; with the new equipment, filters need changing/washing every now and then; and more planning is involved now that we only drive electric (although we prefer it and will never buy a fuel vehicle again).

However, our retrofit has made a huge difference to our overall standard of living: Pollen and dust have both reduced significantly; there is no mould (ever!), reducing cleaning; car and hot water running costs are almost nil; heating is reduced to 4 months a year; solar gain is reduced in summer; there's no cost from energy usage working from home; and the house is perfect for drying wet clothes indoors (no tumble dryer needed). I could go on…

Future plans

This is an ongoing project as we are always looking for ways to improve the property. For example, we are about to have a house battery installed, investigations are underway for a ground source heat pump, and we are looking to only have one long range BEV.

Advice and Information

We would highly recommend our suppliers and found our builder very helpful in providing information. Sometimes the simplest change can make the biggest difference, and much can be done on a small budget (the cavity wall insulation cost £50 in total). We also found that some expensive features can be cheaper than you think.

Key contacts, products and advice

Groundwork: The Home & Garden Company
(Foundation, front drive, rear landscaping)
Building work: Salmon & son builders (Inc electrical and plumbing)
Solar hot water: Carmichael-Browns
Solar PV: A Shade Greener
Kitchen and bespoke furniture: Kestrel Bespoke Furniture

Key specifications

Energy Usage (per year)

Electricity	Gas	Other fuel	Water
4800kWh*	950 kWh	0 kWh	n/a

*1000kWh of this is used for charging 2 EVs (the 2 EVs use about 2000kWh total per year)

Insulation and Glazing

- Mostly solid foil covered foam insulation.
- Underfloor, cavity wall, under-barge board and loft (floor and ceiling).
- Hi-quality double glazing.
- Inter-glazed blinds to south windows to reduce solar gain.

Heating and Energy

- LED lighting throughout.
- Solar hot water.
- MVHR.
- 4.5kW Solar PV.
- High efficiency gas boiler with heating zones and room thermostats.
- High efficiency radiators.
- Heat store with solar panel in garden.

Transport

- Smart solar to EV charging.
- Mostly walk and cycle.

Garden

- Sunny and cool areas to match weather.
- Chickens, vegetable garden, fruit trees/bushes.

Sustainable materials

- Greenhouse and raised beds constructed from recycled materials only.
- Reclaimed timber floorboards.