People Exploring Low Energy Homes

www.openecohomes.org
www.cambridgecarbonfootprint.org

High Street, CB3 0QA

Kate and Nick – Kate says:

Nick and I first talked about building a house 6 or 7 years ago. We are both practical people – we had design, project management and small scale renovation experience between us and plenty of enthusiasm. It was quite a journey and more than we bargained for but we are very proud of the finished product.

Overview

Age, Type: **2012, Custom Build, Detatched**

Wall type, Floor area: **SIPs construction, 160 sq m**

Project timescale: **4.5 yrs total, build time 1 yr**

Cost of build: **£350,000**

Energy usage – 2 adults

After: **9 kWh** per sq m pa electricity
95 kWh per sq m pa gas

Before: **36 kWh** per sq m pa electricity (old house)
89 kWh per sq m pa gas (old house)

Key features

+ oriented and designed to benefit from solar gain
+ structurally insulated panels (SIPS) construction
+ super insulated, whole envelope U value <0.13
+ Air tight – 2.4 a/c per hour achieved
+ ventilation pre heat via conservatory
+ whole house intelligent ventilation for cold season
+ active/natural ventilation routes for warm season
+ rammed earth feature wall, providing thermal mass
+ condensing gas boiler, thermal store, zoned UFH
+ solar thermal panels feeding into thermal store
+ 3.8 kw solar pv panels
+ timber framed triple glazing – U value around 1
+ rainwater harvesting feeding outdoor tap, toilets and washing machine
+ reclaimed materials
+ water and energy efficient fittings/appliances
+ traditional larder
+ green roof on carport

We keenly felt the opportunity we had to reduce our need for fossil fuels through good design whilst creating a comfortable living environment. Early on I read *The Whole House Book* by Cindy Harris and Pat Borer and would recommend it to everyone building or renovating.

The Building Process

We spent a year or so looking for land before accepting the very kind offer from my parents of a strip of their garden. We settled on AC Architects as they seemed the most in tune with our thinking and they did a wonderful job of interpreting our brief and came up with the basic design we have now.

After what had seemed like a positive meeting with the council planning team they stated that they would refuse our design and stipulated that it should be a single storey building. We got planning permission a year later without having to move too far from our original design, but it required a very comprehensive design statement, some lobbying and a planning council meeting to get us there.

It then took the best part of a year working with ACA to research available products, get costs for the major elements (to ensure we were going to stay in budget) and to finalise detailed drawings and create a design specification document.

With those in hand we went out to tender and found a local builder, Ian Rudd, to take on the project. We made the decision to do the site management ourselves with Nick able to commit part of his working week. ACA stayed involved throughout the process to manage the contracts.

We also took on one part of the build ourselves – the rammed earth wall (REW). We set ourselves an extremely ambitious goal with the REW as it was to be 5.2 metres high. The only higher examples we could find in the country built without cement were at the Centre for Alternative Technology in Wales.

Our first attempt at the wall failed – it literally fell down – which was devastating. With a massive effort we delayed the rest of the build and regrouped.

The rest of the build went by relatively smoothly. We moved in last June and it was joyful to behold our newly finished building. It has proved over the year to be a very comfortable place to live, we love the light, the space, our views and our rammed earth wall (REW).

Low Energy Measures

We tried to stick to basic principals during the design process. Our first decisions were about form; to fullfill our space requirements but also importantly to try and benefit from **solar gain**, all our **large glazing areas face SE through SW**.

Regarding the building fabric we wanted to **super insulate** and **build airtight**. **SIPs offer excellent U values** (insulation properties) in a comparatively thin material and their factory production **minimises waste and build time** on site. They offer **less scope for gaps** than some construction methods however a lot of vigilance was needed on site to ensure gaps were not left in the envelope.

It took a very long time to decide upon a ventilation and heating strategy with such differing opinions out there. Passive stack ventilation and a gasifying log batch burner were our initial preferences but in the end we have gone with **gas, solar thermal** and an **'intelligent' whole house extraction system**.

Performance

The heating system has taken a little time to get used to (it's a bit strange living in a house that is warm all the time!) but all teething troubles have been minor and our bills during this extended winter have been very reasonable with our summer PV earnings outstripping our yearly gas bill.

Future Plans

We hope to use less gas next winter with the installation of a log burner with a back boiler connected to the thermal store. We also have a few projects in the garden to keep us busy and Nick is having a good time getting us set up for lambs, bees and chickens!

Professional Contacts

Architects: AC Architects Cambridge Ltd. www.acarchitecs.com

Main contractor: Ian Rudd, ian.rudd58@live.co.uk

Products and Costs

Structurally Insulated Panels: Whole house structure at 175mm and insulation to u-value 0.14, £49k, SIPs UK, www.sips.uk.com

Windows/doors: Euro Profile timber framed triple glazing windows and doors, £15.5k, Greensteps, www.greensteps.co.uk

Folding sliding doors (including installation): £6k, Solorlux through Ecomerchant, www.ecomerchant.co.uk

Roof lights: £6k, Velux, www.velux.co.uk

Heating system: including UFH, Greenstar 24Ri condensing boiler, Ecocat thermal store, 2 x 12 evacuated tube solar thermal, £13k, Chelmer Heating, www.chelmerheating.co.uk

PV panels: 3.8kW Sharpe panels and Aurora inverter, £12.3k, Joju www.jojusolar.co.uk

Rainwater harvesting system: 3750l tank with header tank, £2.5k, www.rainwaterharvesting.co.uk

Ventilation: Whole house assisted ventilation system (iMEV), £860, Passivent www.passivent.com