

# How We Let the Sunshine into our Home



## Property Overview

**Project timescale:** April 2019 - Dec 2020

**Type:** New-build detached house

**Wall type:** Timber frame

**Floor area:** 255m<sup>2</sup>

**Cost of Build:** £449k

**Occupants:** 2 adults

## Meet your hosts, Trevor & Mary:

In 2003, we bought the original property in whose garden our new home was subsequently built.

## Design, Financing & Construction

When we started this project in 2016, we were both in full-time work. Our brief to the architect was to design a flexible and adaptable home, so that if necessary, we could easily adapt our home to ground floor living. This resulted in very careful design of all the plumbing and electric circuitry, the UFH and MVHR systems, and even allowing an area for a lift to be installed at a later date.

We thought that if we were going to build a new home it had to be made from the most modern and thermally efficient materials possible: the extra cost of high performance insulation and paying attention to thermal bridges would save considerable amounts of energy in the future. The pay-back period could be decades, but we felt it was the right thing to do.

The planning process was long and frustrating: partly because we are in a conservation area, and partly due to late stage re-design, which added considerable expense to the planning and eventual build. Having attended many self-build shows and presentations to learn from the experience of others, the strong message was to 'keep things simple' - and in this we completely failed! However, if we had wanted a 'bog standard house' we could have bought one from a developer. Thankfully, planning permission was finally granted in March 2018.

Like many couples self-building, one of us was far more keen than the other, which invariably means good communication is vital. Work started in May 2019 and progressed well. Unfortunately, uncertainties and new procedures around Brexit coupled with the inevitable problems caused by the Covid pandemic resulted in significant increases to costs and severe delays. The build was finally finished in December 2020. And so, all the pain and frustration of the lengthy process was soon forgotten and we now take great pleasure and pride in our creation.



*Wildlife friendly planting*

## Our top tips:

- Invest in the performance of the structure - it is disappointing how far behind most of the building trade is in building in energy efficiency
- Control very, very carefully all the trades wanting to puncture the shell of the house. We minimised this & only had breaches through the plant room; we supervised every hole made & its back filling
- Act quickly when you spot sloppy workmanship
- Set up a well thought out paperwork system before the project start, as you very quickly get inundated with invoices, amendments, drawings & quotes - you will not regret it!

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## Key Features of our new home

We chose [Kingspan](#) for all our insulation: Kooltherm K112 was used for the floor (220mm) and the walls (140mm within the timber frame + 50mm internal continuous layer); K107 was used for the roof insulation (220mm + 50mm internal continuous layer); the garage floor required high load-bearing [Green Guard GG300](#). The internal reflective vapour control layer and external wrap added further thermal protection. Altogether, this meant our new home achieved airtightness close to [passivhaus standards](#) with 0.68 air changes per hour @50Pa test pressure; the thermal insulation has a U-value of 0.11 W/m<sup>2</sup>K.

Our windows, skylights and Velux are all triple glazed and from [Internorm](#). They have an average U-value of 0.78 W/m<sup>2</sup>K, including the frame. Our external doors are also from Internorm with a U-value of 0.81 W/m<sup>2</sup>K. The sound insulation is an impressive 38dB.

All light fittings are LED; the appliances are all new and chosen for their low energy performance. The lighting in the ground floor open plan area is controlled through a [RAKO system](#), which handles 12 circuits, has 4 pre-set “mood” settings, and is infinitely variable through an App.

The ground floor and first floor have UFH with multiple zones controlled by [Nu-Heat wall controllers](#) in each room. Heating and DHW is supplied by a [NIBE F2040 ASHP](#). There is a 100 litre buffer tank for the UFH and a 400 litre buffer tank for the DHW. It is controlled through a [NIBE SMO 20](#) system. This works really well and we have not touched it since installation. There is always plenty of hot water and the house is a constant 22°C throughout.

We have a [REGA MVHR system](#) which is very effective, especially during the 9 months outside of the summer period; in the summer months, we tend to have doors and windows open most of the time. To help on the really hot days, we have 3 electrically controlled skylights, which, along with opened windows on the North elevation provide very nice ventilation. The large ground floor slider window faces South West but is shaded by a permanent canopy. We could fit reflective film on the windows, but so far we don't think it necessary.

We retrofitted 5.4kWp of PV panels over 2 elevations of the house (SE & SW) in late July 2021 after our VAT reclaim was paid. They are connected to a [Givenergy 8.4kWh battery](#). Our electricity is supplied through Octopus who have the

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## Key Specifications

Energy Consumption	Energy kWh/m <sup>2</sup> /pa			Carbon kgCO <sub>2</sub> e/pa (excludes renewables)	
	Mains Electricity	Solar PV*	Total	/m <sup>2</sup>	/person
New home (255m <sup>2</sup> )	14.7	13.1	27.8	2.9	365

\*A further 1750kWh was exported to the grid

### Insulation & Glazing

- Super insulated floors (220mm), walls (140mm+50mm) & roof (220mm+50mm); U=0.11
- Triple glazed windows & doors

### Heating & Energy

- 5.4kWp Solar PV & 8.4kWh battery
- ASHP
- Zoned UFH
- MVHR system

### Water, Garden & Natural Systems

- Wildlife friendly garden; native & drought tolerant planting

### Key Contacts, Products & Advice - all recommended:

Architect: Rob Clark, [AMA architects](#), (+ legal fees £32k)

Project Manager: Neil Strong, [Delta Project Management](#) (£14k)

Kitchen: [Tomas Kitchens](#) (£37.6k)

Electrics: Gaz Colfer 07920 198505

[Bartram](#) Timber frame erected by Timber Construction (£64k)

Veio aluminium roof - [J&PW Developments Ltd](#) (£34.4k)

Velux skylights (£2.5k)

[Internorm](#) windows & door (£35.5k)

Cladding & rendering - [EMR Renders](#) (£20.8k)

Heating, ASHP, Nu heat UFH & plumbing - Martin Smyth

[Proheat](#) (£25.8k)

Bathroom fittings - [Cambridgeshire Bathrooms](#) (£18.6k)

[REGA](#) MVHR (£5.2k)

Electrics including [RAKO](#) control system (£23.4k)

PV panels and battery - [Halo Renewables](#) (£6k)

VAT refund from HMRC: £14.5k

All prices include installation

highest [Smart Export Guarantee](#) (SEG) tariff. We anticipate an annual payment of around £120. However, we are also investigating their new trading tariff which would pay us to take energy from the grid overnight to recharge the battery, and could prove cost effective in the winter months.

### Performance

The biggest noticeable gain for us is the superb and plentiful natural light that we now enjoy throughout the seasons. The house is very comfortable and we love hosting our guests in the open plan area.

