

Eco-Renovating for Retirement - Arbury



Property Overview

Property age: 1952
Project timescale: 2006 to present
Type: Detached
Wall type: Solid brick
Floor area: 140m²
Occupants: 2 adults

Meet your hosts, Tom & Gill:

We bought our home in 2006 as a retirement home. Since then, we've been gradually renovating it as time and finances allowed. As older people, we did have some capital to invest, and we judged it responsible and worthwhile to invest in items that would contribute to the alleviation of eco concerns as well as reducing regular outgoings.

When we bought the house, it came with some big challenges:

- Solid walls, potentially difficult to insulate
- Old gas boiler with single pipe radiator system
- Poorly insulated hot water tank and header tank
- Minimal loft insulation: about two inches of glass fibre
- Aluminium framed double glazed windows covered in condensation
- A through lounge/dining room with a gas fire towards the back
- A small garage: too narrow for a modern car, with access restricted by protruding gas and electricity meters on the outside wall

We knew we wanted to dramatically improve insulation while reducing the risk of mould growth on the walls, and save on heating bills. We also wanted to add an extension to provide more living space, so we contacted a local architect, [Nick Twitchett](#), to draw up plans.

Key improvements

2007: The central heating failed and a completely new two pipe system was installed with a **condensing boiler**; the airing cupboard was removed. The Vaillant boiler still works at 98% efficiency.

2008: Most of the aluminium-framed windows were replaced with UPVC-framed double glazing, except where the extension had been planned; a new front door replaced the aluminium door which had severe condensation. The walls of the main rooms were internally insulated using the thinnest material recommended at the time, [TLX Multifoil Insulation](#) (U-value: 0.2) applied to battens and covered with plasterboard. We also insulated the outside wall of the front bedroom and added multiple power sockets as this would be used as an office and needed to be warm.

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Chandelier with LED bulbs



Gill holding up insulated plasterboard

Our top tips:

- **Triple glazing is much better than the best double glazing**
- **If the roof is suitable, fit solar panels**
- **Insulate, insulate, insulate!**



2008(Continued): A new shed was built to replace the **storage space** that would be lost once the garage was taken down in order to build the extension. Now fully insulated, the shed can be heated to 20C at very low cost, using a convector heater and/or a dehumidifier.

2009: A **single storey fully insulated extension** of around 40m² was built to the rear of the house. Having already insulated much of the main house, this resulted in a reduced overall heating bill for the entire house.

We used **insulation-backed plasterboard** to line the walls of the hall in December 2009. The rest of the lining proceeded piecemeal, with the back bedrooms done last.

With three 200 litre butts and a zinc tank, we have 1,000 litres of **water storage**, which is not quite enough in a dry summer. In the summer, we syphon water from the shower to use for the garden, having done the same in our previous house. We have also joined the [Trees for Streets scheme](#), and water newly planted trees nearby. Research suggests that [every £1 spent on trees saves the UK £7 in healthcare, energy and environmental costs](#).

2012: Solar panels were installed just before the feed-in-tarrif was reduced from 45p per kWh. This rate, which rises with inflation, is guaranteed for 25 years. Now, half way through this period, the revenue has paid for the £9,000 cost *twice over*. After six years, the inverter failed but the replacement cost only £500 and is guaranteed for 10 years.

The total amount of electricity generated in a year is 50% more than the amount of electricity we pay for. We are paid for some of the excess which goes to the grid. The annual solar yield is 3,500kWh and paid for consumption was 2,500kWh, so we were effectively net zero (until we bought the electric car).

Replacing our bedroom window with a **triple glazed unit** was a revelation: the improvement in terms of noise and heat insulation, was enormous! We are now fully triple glazed.

2019: We replaced all our major electrical appliances with the most **energy efficient models** available: this included the fridge, freezer, washer, dishwasher, and microwave oven.

2022: We bought an **EV** (hideously expensive, but saves the planet) and installed an electric charging point - the latter cost £900 and delivers 7kW per hour, whereas a single 13 amp mains plug delivers half of this.

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Key Specifications

Insulation & Glazing

- 50mm Internal wall insulation throughout
- Loft insulation
- Full triple glazing

Heating & Energy

- Condensing boiler with 2 pipe system
- 3.8 kWp solar PV
- 10.5kWh battery storage
- EV & Charging Unit

Energy Consumption	Energy kWh/m ² /pa			Carbon kgCO ₂ e/pa	
	Gas	Electricity	Total	/m ²	/person
Current Usage	71.4	17.9	89.3	16.3	1142

(EV charging not included)

Water, Garden & Natural Systems

- 1,000L rainwater storage capacity; shower water re-used in summer
- Compost bins & wormery; fruit trees & vegetable plot

Three **batteries** providing 10.5kWh of electricity are stored under the stairs. This is enough power for the day and they are [charged overnight at 7.5p/kWh](#). This means no electricity is bought during peak periods, reducing the strain on the national grid. By using an energy monitoring app, we can adjust our energy use to maximise the benefits of having both solar PV and battery storage.

Performance

Our home is now larger and significantly more comfortable, without increasing our heating bills. The new rooflights and bifold doors provide much welcome light and capture more warmth from the sun during the winter; while the triple glazing kept the house cooler during the intense heat of Summer 2022. It feels good to know that we are minimising, as far as possible, our use of fossil-fuel generated power.

Key Contacts, Products & Advice:

Architect: [Nick Twitchett](#), Arbury Road

Solar PV (£9k) & Inverter replacement: [Navitron](#)
(no longer available)

Loft insulation (£1.5k): [Aran](#)

Battery installation (£8k) & monitoring: [ESE](#)

Triple glazed windows: [Tradeframe, Peterborough](#)

Information on solid wall insulation: [Cambridge City Council](#)

