1990s Estate House, IP7 5JL

Jonas Grist –

He says:

This is our family home where my wife and 3 children live. We moved here in 2004. It was built in 1992 by Wimpey Bovis and the walls are built from brick and block with an insulated cavity wall. It has a solid concrete floor and the roof is insulated to the equivalent of 250mm of insulation, despite being used for storage. The main heating fuel for the radiators and hot water is mains gas. For its age this house is comfortable and relatively energy and water efficient. Other than the solar PV panels, all the other green features are of the no cost/low cost type. The difference they make however should not be underestimated and proves that you don't have to spend vast amounts of money to reduce your domestic eco-footprint.

Solar Panels

Our 10 solar PV panels (rated at 2.5kWp) that were installed in April 2011 generate approximately 60% of our annual electricity needs despite facing WSW. The system cost £8,500 (it would a fraction of that now), however the upside is that I am benefitting from the higher 'feed-in tariff generation rate, currently 45 pence for every kWhr the panels produce. On average they generate 2,000 units of electricity per year, for which I receive a feed-in-tariff income of £900 per year, (tax free and index linked for another 22 years). Because I use 60% less grid electricity my electricity bill is currently £260 lower. In total therefore the solar panels give me a combined income/saving of £1,185 per year. The system will therefore pay for itself by year 7.

Internal insulation

The integral garage had been badly converted before we moved in and was always cold. I solved this by making a small access hole in the ceiling and stuffed it full of with rock wool. I also used second grade PIR Celotex boards with battens to insulate the outside facing walls and finished it with pine cladding to avoid the cost/hassle of needing to plaster it. I think the end effect is quite attractive.

Loft Insulation

When we moved in the loft area was mainly boarded out with only 100mm of insulation beneath it. To avoid the hassle and cost of lifting the boards, raising the floor joists, installing more insulation and then replacing the boards - we opted instead to fit 150mm second grade Celotex PIR insulation boards (cut to fit through the loft hatch) and place carpet over the top which we can walk/store items on. PIR insulation typically is equivalent to double the depth of regular rock-wool insulation.

Overview

Age, Type: 1992, Domestic, 145 m^2
Cost of measures: £12,000

Electricity use:	**2004:** 4,240 kWhrs **2013**: 3,050 kWhrs
Gas use:	**2004:** 17,200 kWhrs **2012:** 14,800 kWhrs
Combined Energy use:	123 kWhrs/m^2
Water Use:	**2004**: 118 m^3 per yr **2013**: 130 m^3 per yr

Features

- 10 Sharp Solar PV panels (2.5kWp)
- Veissman condensing gas boiler
- Heating controls
- Low Energy Lighting (LED & CFLs)
- Internal insulation to converted integral garage
- Loft Insulation (PIR and rockwool)
- Ventilation (Positive Input type)
- Water efficiency fittings
- 800l Compost bin

Lights

Rather than wait for old incandescent light bulbs to blow before replacing them with their low energy equivalents, we replaced virtually every light bulb in the house over a period of months with a mixture of compact fluorescents (CFLs) and LEDs. This has significantly reduced our electricity consumption. The LEDs in the kitchen, that have a GU10 fitting, are particularly cost effective, as these lights are on more than any others and have reduced my total electricity use by ~10%. Their price tag of £17 per bulb may seem expensive but this pays for itself in less than 2 years and saves £9 per bulb, per year thereafter.

Boiler & Heating Controls

I replaced the 17 year old gas boiler with a highly efficient Veissman condensing unvented boiler and megaflow hotwater cylinder at a cost of £3k. The latter meant I no longer needed the cold water tank in the roof. At the same time, extra heating controls were installed - including TRVs and a digital room thermostat. I believe the extra heating controls saved as much energy as the new boiler and cannot be recommended highly enough!

Ventilation

To increase levels of ventilation and to avoid condensation forming on our windows upstairs I have fitted a Positive Input Ventilation (PIV) system in the landing stairwell (costing £300 incl. fitting). This also keeps the downstairs area warmer and stops a chimney effect of the heat escaping up the stairwell and through the roof.

Other Measures

Making these changes to our home has been just part of a wider shift to living a more sustainable life. Through the use of low energy solutions, together with simple behaviour change, we have reduced the household energy consumption by ~20%. First indications are that the Eco Camel shower heads have significantly reduced our hot water use (following a steady rise in water after 2 extra children) and as the children grow older these should off-set any future increases.

We have also changed the way we shop to reduce wastage and focus on local and seasonal produce. We have taken on an allotment in addition to the small veggie patch we already have in the garden (that includes a 800l compost bin that 'eats' all our food waste to produce lovely compost).

Evaluation

From my own unscientific assessment, the loft insulation, internal insulation and heating controls have the greatest difference to the amount of heating required for the house. The solar PV system is producing more than I expected and is a good source of income. Finally the Eco-camel shower heads are very highly recommended.

Future additions

In the longer term I am considering fitting a wood burning stove in the lounge, although the cost of the stove, converting the fire place and fitting a flue pipe cannot currently be justified by the cost savings alone.

If you have any specific questions about this case study, these can be sent to the building owner via the website:

www.greensuffolk.org/sgbn

Specifications & Professional Contacts

Solar PV system:

- **Panels: Sharp NU245 Monocrystaline**
- **Inverter: SMA Sunny Boy HF3000**
- **Display: SMA Sunny Beam**
- **Roof mountings: Schuco**
- **System installed by Pro Solar Power**
  www.prosolarpower.co.uk
  Telephone: 0800 6446 077

Heating and Hotwater system:

- **Gas Boiler: Veissman 100 Vitodens**
- **Mega flow unvented Saniton 210ltr HW cylinder www.saniton.com**
- **Installed by Round House Services**
  www.roundhouse-services.co.uk
  Telephone 01473829741

Heating Controls:

- **Danfoss TP5 digital room thermostat**
  www.screwfix.com
- **Danfoss TRVs**

Lighting:

- **Philips GU10 6W Perfect fit Dimmable 40^0 www.ledbulbs.co.uk**

Ventilation:

- **Nuaire, Drimaster - PIV system**
  www.dryhomes.net

Loft and Internal insulation:

- **Class C discounted PIR boards (Celotex). Buildbase in Hadleigh**
  www.buildbase.co.uk

Water Efficiency:

- **Eco-Camel shower heads**
  www.ecocamel.com