

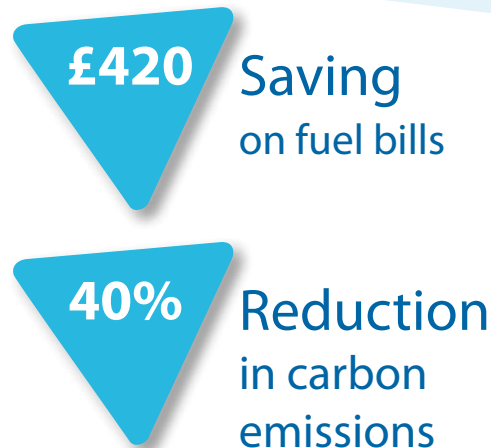
1980s chalet-style house Salisbury

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Case study 20



Measures installed	Total cost	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Cavity wall insulation	£199	0.37	£63
New boiler	£2,027	0.85	£145
Insulation to dormer flat roofs	£1,645	0.31	£53
Solar hot water	£4,339	0.19	£29
Solar PV (1.72 kWp)	£8,980	0.72	£130
Total package	£17,190	2.44	£420
Plus income from PV Feed-In Tariff (FIT)			£597

The home

This home is a detached, chalet-style house with dormer windows, built in the mid 1980s. It was constructed with a cavity wall with a thin polystyrene sheet fixed to the inner wall to provide some insulation.

The loft insulation had been topped up recently by the owners who have lived there since 2006, and the home is double glazed throughout.

At the time of the Target 2050 survey the house was heated by gas central heating with the original G-rated gas boiler that had been installed when it was built.

What they did

The first step was to insulate the cavity walls, retaining as much heat as possible in the home. The owners considered alternatives to gas central heating before deciding to

retain it, and to replace the old boiler with a new high efficiency one, together with solar water heating.

Serious consideration was then given to the possibility of adding photovoltaic panels to supply some of the electricity needs of the home, and installing this was completed after repairing and insulating the dormer window roofs.

The last step was to improve the level of low energy lighting. Measures installed to date have reduced the energy bill for this household by an estimated 40%.

“As we’re retired we often need heating on during the day, but we’re now using well below average, and the gas and electricity bills have been cut by nearly 40%.”



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Cavity wall insulation

Improving insulation of the cavity walls was a priority. A locally recommended installer, WarmSpace, were engaged to insulate the partially filled cavity with polystyrene beads

Replacement gas boiler

Next the owners addressed the replacement of the 25-year-old boiler. Several options were investigated as an alternative to gas central heating. A combined heat and power (CHP) system, air and ground source heat pumps were considered, but space, cost and savings considerations indicated an efficient gas condensing boiler as the best choice. Aquagas were commissioned to power-flush the system and fit a new A-rated boiler for around £2,000.



Well insulated cylinder connected to solar thermal and boiler

Solar water heating

Soltrac, from the Salisbury area, installed a Schuco flat plate solar panel on the rear, west-south-west facing roof, together with a new 150 litre cylinder fitted into the existing airing cupboard. The installer had to ensure that the restricted dimensions of the cupboard provided an adequate cylinder size for the output of the installed panel. The full system was installed for just over £4,300.

Solar electricity

The owners researched the viability of photovoltaic panels for their house, which does not have a south-facing roof. By calculating roof inclination, orientation and specifying their location they were able to use some freely available web based tools to estimate the output for a 1kWp (kilowatt peak) system. This, along with the survey carried out by Soltrac persuaded them that a 1.72 kWp system was financially viable.

The panels were installed in early March 2011, with a small amount of additional work on the existing toilet stack, which was adjusted and re-vented to prevent pipe-work shading the adjacent panels, which can adversely affect output.

Insulation of dormer windows

The owners had previously internally insulated the dormer side walls, and now a leak in one dormer roof led them to look at replacing the original roofing on all five, and to take the opportunity to insulate them all at the same time. This had to be done before fitting the PV panels as there would not have been workable room to fix the new roofing felt and insulation afterwards. A. Wells and Sons completed the process of stripping the roofing felt, fixing a vapour barrier and 50mm solid foam insulation boards before bonding a new bitumen finished roof covering. The owners noticed an immediate difference in warmth in these areas.

Low energy lighting

The householders are replacing some of their lighting with low wattage LEDs, trying out different models to find out which ones they like.

Next steps

Future plans include improved heating controls, a wood burning stove, and internal insulation to the sloping ceilings upstairs.

Energy consumption	Total (kWh)	Per m ² floor area
Before improvement (2007)	26,201	270
After improvement (2010)	15,955	164
With all possible measures	13,988	144
UK average (2011)	19,800 ¹	217 ⁴

CO ₂ emissions	Total (tonnes)	Kg per m ² floor area
Before improvement (2007)	6.06	62
After improvement (2010)	3.61	37
With all possible measures	3.20	33
UK average (2011)	6.00 ²	66 ⁴

Running costs	Total	Per m ² floor area
Before improvement (2007)	£1,382	£14.22
After improvement (2010) - excl FIT income	£962	£9.90
With all possible measures	£905	£9.31
UK average (2011)	£1,032 ³	£11.34 ⁴

Possible next steps	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Wood burning stove	0.21	£13
Solid floor insulation	0.44	£77
Total	0.65	£90

¹Ofgem 2011

²English Housing Condition Survey 2011

³Ofgem 2011

⁴Based on 91m² from English Housing Condition Survey 2011