

1950s detached house Cheltenham

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Case study 22



£925

Saving
on fuel bills

41%

Reduction
in carbon
emissions

Measures installed	Total cost	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Cavity wall insulation	£348	3.21	£553
Replacement boiler and controls	£5,823	1.72	£296
Solar hot water	£4,620	0.47	£76
Total package	£10,791	5.40	£925

The home

This is a detached house built in the mid 1950s and extended in the late 1980s and 1990s. The current owners purchased the property in 2009, and were aware that various improvements could be made to improve its energy efficiency. During their first winter in the property they noticed that the house felt cold, and they realised that the cost of providing space and water heating was going to be much more than they had anticipated.

What they did

The homeowners initially began to make their own improvements to the house, adding loft insulation to achieve a depth of 250mm. They also began to look into the possibility of installing solar thermal panels to contribute to their hot water requirements.

The advice from Target 2050 initially triggered the family to insulate the cavity walls, the main area of heat loss in the house. This was completed simply and effectively through the local authority approved insulation scheme, Gloucestershire Warm and Well, for around £350. After the insulation had been installed, the family noted that the entire house was warmer in winter. They also commented that the rear south facing rooms, which would get very hot in the summer, were noticeably more comfortable now. Insulation helps to keep the home cooler in hot weather as well as warmer in cold weather.

The next area to be addressed was the replacement of the old and inefficient boiler, and to consider the feasibility of incorporating solar water heating into the new system.

“Our gas consumption is already much lower than last year, and in March we had our first official solar powered shower!”



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Heating improvements

The central heating for the house was provided by a gas fired boiler that was over 20 years old and expensive to run, and many of the radiators needed replacing. Under floor heating was considered but rejected because it would have been necessary to dig up the concrete floor, a costly and disruptive process in an occupied home. If this had been chosen as an option, the householders would have taken the opportunity to insulate underneath the new concrete floor when it was laid. Under floor insulation was also considered in other areas of the home, but the floor height would have had to be raised to accommodate a useful level of insulation.

Shackleton & Wintle Ltd, a local plumbing and heating company were employed to implement a number of heating improvements across the house. The existing boiler was replaced with an 'A' rated condensing boiler along with upgraded heating controls including a wireless room thermostat, programmer and new thermostatic radiator valves for all the radiators.

Solar water heating

The family also recognised that the heating improvements provided the ideal opportunity to install the solar thermal system which they had already decided that they wanted. This involved fitting two flat plate solar panels to their rear, south west facing roof. The panels are connected to a new 250 litre unvented, twin coil cylinder. The total cost for the new boiler, controls, cylinder and solar panels amounted to just over £10,400.

Since having their new heating system the family has found that their gas consumption is already much lower than the previous year, and they are benefitting from the installation of the thermostatic radiator valves which allow them to control individual room temperatures far more easily. In only a short time from when the majority of the work was completed,



Twin coil hot water cylinder installed in airing cupboard

a gas bill had displayed a proven reduction. Their electricity bill has also been reduced as the house is much warmer, meaning they no longer have to use their electric blanket!

Next steps

The family are continuing to investigate ways of improving the energy efficiency of their home. Future plans include adding a solar photovoltaic (PV) array alongside their solar thermal system to generate a proportion of the electricity used in their home.

Energy consumption	Total (kWh)	Per m ² floor area
Before improvement (2010)	58,755	318
After improvement (2011)	31,121	169
With all possible measures	25,930	141
UK average (2011)	19,800 ¹	217 ⁴

Running costs	Total	Per m ² floor area
Before improvement (2010)	£2,715	£14.72
After improvement (2011)	£1,790	£9.70
With all possible measures	£1,518	£8.23
UK average (2011)	£1,032 ³	£11.34 ⁴

¹Ofgem 2011

²English Housing Condition Survey 2011

CO ₂ emissions	Total (tonnes)	Kg per m ² floor area
Before improvement (2010)	13.03	71
After improvement (2011)	7.63	41
With all possible measures	6.21	34
UK average (2011)	6.00 ²	66 ⁴

Possible next steps	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Solar PV 1 kWp	0.53	£95

³Ofgem 2011

⁴Based on 91m² from English Housing Condition Survey 2011