

1970s detached house Cranham

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Case study 2



£933

Saving
on fuel bills

71%

Reduction
in carbon
emissions

Measures installed	Total cost	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Cavity wall insulation	£260	1.37	£216
Wood burning stove with thermal store	£6,203	3.76	£355
Solar hot water	£12,992	0.53	£240
New oil boiler and heating controls	£5,015	0.86	£122
Total package	£24,470	6.52	£933

The home

This early 1970s detached house is deceptively large, with a single storey at the front and two at the back, the lower floor being built into the hillside.

With no insulation in its cavity walls, a mix of single and double glazed windows, high ceilings and an open plan layout, the current owners, who bought the house around 10 years ago, had always found it a challenge to heat.

It is not on the mains gas network, and has oil-fired central heating, which was still powered by the original 40 year old boiler when they joined the Target 2050 programme.

What they did

The first and most significant step was to insulate the cavity walls, the main area of heat loss. This was done simply and effectively for around £200, by a Swindon-based company called Warm Space Insulation, with a noticeable impact in terms of comfort.

The remaining single glazed windows and the single glazed front door and porch were then replaced with UPVC double glazing by Clive Budding, an independent double glazing contractor based in Gloucester.

This was quickly followed by the decision to replace the old oil boiler and look at innovative ways of reducing the household's dependence on oil. The householders were keen to investigate if and how they could use renewable energy, and found a solution that combined solar and biomass technologies with what they already had in place.

"Our house has
changed from a cold
draughty house to a
warm cosy one."



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DISTRICT
COUNCIL**
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Large solar thermal system

With measures to reduce heat loss completed, the family needed ideas to improve and update the house's space and water heating systems. The old oil boiler needed replacing and the householders wanted to maximise the efficiency of the heating system while integrating renewable technologies, to reduce their reliance on oil.

The chosen system consists of six evacuated tube solar panels and a wood burning stove serving a very large thermal store, with a small oil boiler as back up. As the main roofs of the house face east and west, solar panels were positioned on the south facing gable end wall. They were mounted on brackets protruding more than 200mm from the house, so planning permission was needed. This was granted without a problem by Stroud District Council, but the time taken for this process to be completed meant they were installed two months after the main heating system.

Wood burning stove with thermal store

The new Lenius log burner is a modern design providing the family with a delightful focal point in the evenings. It supplies 30% of its heat to the room, heating the whole of their living space on the upper floor, with the remaining 70% feeding into the 800 litre Solus II thermal store, an immense hot water tank in a store room on the lower floor. The stored heat provides all the remaining space heating and mains pressure hot water. When space heating is required, the stored heat is circulated around the radiator system without running a new heat source. The entire system was installed by the Green Shop of Bisley, near Stroud, for £24,200.

The solar panels supply most of the hot water needs in the summer, while the log burner is used as a top up in the winter and on cloudy days to ensure there is enough hot water in the morning. The householders estimate that although they are burning more logs, their oil consumption will reduce by over 50% over a year. They have also seen a reduction in electricity use of nearly 25%, which is partly due to the householders' more energy efficient habits but may also



High efficiency woodburning stove

have something to do with the inefficiency of the pumps on the old central heating system.

Next steps

The family is now considering improving the depth of insulation in some of the sloping ceiling areas and replacing some of the older double glazing that is starting to fail. They are also thinking about installing solar photovoltaic panels which will further reduce their carbon emissions as well as reducing electricity bills and providing income for the electricity generated.

Energy consumption	Total (kWh)	Per m ² floor area
Before improvement (2007)	33,074	230
After improvement (2010)	25,232	175
With all possible measures	21,622	150
UK average (2010)	19,800 ¹	243 ⁴

Running costs	Total	Per m ² floor area
Before improvement (2007)	£1,670	£11.61
After improvement (2010)	£737	£5.12
With all possible measures	£588	£4.09
UK average (2010)	£1,032 ³	£12.15 ⁴

¹ Energy Saving Trust, 2010

² English House Condition Survey, 2007 (private sector housing only)

CO ₂ emissions	Total (tonnes)	Kg per m ² floor area
Before improvement (2007)	9.17	64
After improvement (2010)	2.65	18
With all possible measures	1.92	13
UK average (2010)	7.10 ²	72 ⁴

Possible next steps	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Double glazing	0.30	£48
Solar PV (1 kWp)	0.29	£61
Total	0.59	£109

³ U Switch, March 2010

⁴ Based on 98m² from English House Condition Survey, 2007 (private sector housing only)