

Grade II listed house Stroud

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Case study 34



£822

Saving
on fuel bills

29%

Reduction
in carbon
emissions

Measures installed	Total cost	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Insulation to roof and sloping ceilings	£11,468	5.90	£747
LED lighting	£451	0.20	£75
Total package	£11,919	6.10	£822

The home

This home is a Grade II listed building that dates back to the middle of the seventeenth century. Built from Cotswold stone it extends over three floors, and is built up against the hillside. On moving in to the property, the current owners found that the house was "freezing; temperatures regularly fell to 6°C at night during the winter, even with the heating on. It was costing us a fortune to heat our home, and even then the house never felt warm enough." It was estimated that the family consistently used around 2,000 litres of oil between December and March, and a similar amount over the rest of the year.

What they did

As the home was listed, the homeowners would have required listed building consent should they have wished to install

any internal insulation on the sloping ceiling areas of the property. A change to the appearance of the house may not have been approved by the local council planning department. They therefore chose to employ an alternative method of improvement in which the insulation was fitted externally beneath the roof tiles.

The success of this work prompted further similar improvements in other areas of the house including utilizing more traditional methods of insulation in a loft and cellar floor area.

These insulation improvements have helped to reduce the homes dependence on oil, and as the householder reported, "the house is now much warmer, and we can keep it warm without leaving the heating on".

"When we moved in to the house it was very cold and draughty. Insulating it has transformed it, making a huge difference to our lives and energy consumption."



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Sloping ceiling insulation

The family employed a local contractor, Hillcot Period Property Services, to begin the process of improving the insulation in the roof areas above their entrance hallway and kitchen. Internally insulating sloping ceilings, where head-room permits, is typically the most common way to insulate these areas. As this was not an option, the installer employed an 'over rafter' method. This involved removing the tiles, battens and roofing felt from all the elevations due to be insulated, and adding two layers of 50mm phenolic foam insulation between the rafters. A breathable roofing membrane was then laid over the top before replacing the battens and re-tiling. In addition, new oak fascia boards were installed, and the roof guttering re-laid. The cost of this work amounted to £7,200.

The family noticed a big difference in the rooms that were now insulated. Consequently, they decided to re-employ the contractor to complete the same process over the adjoining office and playroom which is next to the kitchen. This was completed for £2,800. The householder stated that this 'over rafter' method was the 'perfect retrofit solution' for them, providing a great result, without the mess that can be associated with insulating internally.

Loft and floor insulation

They also had a traditional accessible loft area above a bedroom that had only a small amount of mineral fibre insulation between the joists. They also had Hillcot replace this internally with 50mm phenolic foam insulation.

The completion of the insulation work encouraged the householder to address the floor above the cellar area of the house. He was able to purchase some rolls of mineral wool insulation that he could fit himself between the floor joists. This should aid in preventing cold air from the cellar leaking into the rooms above.



Insulation installed between rafters after removing roof tiles

LED lighting

There were a large number of halogen lights in the house, in particular the kitchen which alone had 18 lights. Halogen lights typically consume around 40-50 watts per bulb. These can be replaced with low energy halogen versions that consume around 30% less energy, or with LED versions that use about 90% less energy. The existing halogen lighting was mains voltage (GU10 fittings) which meant no wiring alterations were needed to install the LEDs. Thirty 4.5W, warm white, dimmable LEDs were purchased from Exclad, a Stroud-based supplier at £12.80 per bulb. Although more expensive than traditional bulbs, they should last for 20 or more years and this family have found that they can now light their entire kitchen using less electricity than just one of their old halogens.

Energy consumption	Total (kWh)	Per m ² floor area
Before improvement (2010)	81,116	293
After improvement (2011)	55,845	202
With all possible measures	30,603	111
UK average (2011)	19,800 ¹	217 ⁴

Running costs	Total	Per m ² floor area
Before improvement (2010)	£3,162	£11.44
After improvement (2011)	£2,340	£8.46
With all possible measures	£1,569	£5.67
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)	21.10	76
After improvement (2011)	15.00	54
With all possible measures	8.80	32
UK average (2011)	6.00 ²	66 ⁴

Possible next steps	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Replacement oil boiler	0.60	£70

³Ofgem 2011

⁴Based on 91m² from English Housing Condition Survey 2011