

Grade II listed house Stonehouse

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Case study 37



£702

Saving
on fuel bills

23%

Reduction
in carbon
emissions

Measures installed	Total cost	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Sloping ceiling insulation	£22,677	3.40	£518
Floor insulation	£140	1.20	£184
Total package	£22,817	4.60	£702

The home

This home was built in 1597 and was for several centuries the home of the owners of the nearby mill. In the 1960s ownership of this Grade II listed home was passed to a local developer who renovated the property, rendering the entire building, and creating three separate dwellings from the original house. The current owners of number 3 have lived there since the late 1990s.

What they did

No thermal improvements had been made to the home since the 1960s renovation until 2009 when the householders insulated the ground floor, which could be accessed from the cellar below. They also renovated all the sash windows and shutters.

Improving insulation and preventing heat loss from the home was the main priority, though the options and methods available had to be carefully considered, due to the potential limitations of listed building status. Various options were explored with the Conservation Officer at Stroud District Council, including internal wall insulation and internal insulation to the sloping ceilings, but the advice was that neither of these measures was likely to receive listed building consent. A decision was therefore made to employ a method that would not require consent as it would not have an adverse impact on either the appearance or structure of the building. This would involve removing the roof tiles and placing insulation in the void underneath before replacing the original tiles.

“Previously there was no insulation in the attic study, which meant that it was very cold in the winter. The insulation has made the house considerably warmer.”



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Sloping ceiling insulation

A local building company, JD Hancock from Gloucester, who had previously completed work for the householder, were engaged to carry out the work of insulating the ceilings. The specification agreed was for 60mm polyisocyanurate (PIR) foam boards to be fitted between the rafters and a multifoil insulation material to be placed over the rafters before the roof covering was replaced.

As the four pitched roofs of the three storey building slope steeply and cover more than 300m² in total, the work was quite challenging. In the words of the householder the roof is “a jumble of peaks and troughs” and the joins between the different roof slopes required careful attention to ensure that they were not compromised, allowing heat loss. Inserting the insulation boards was also not easy as the roof timbers were not spaced equally and neither are they straight meaning that every piece of insulation had to be cut to fit as any gaps would provide a path for warm air to escape.

The most cost-effective time to carry out this work would have been when replacing the roof covering, but this was still effective after nearly 50 years and the householder felt that the thermal improvements were long overdue, so did not want to wait until re-roofing became necessary. The completion of this work did allow for a close inspection of the roof, which revealed that some of the roof tiles needed replacing and also that the ridge tiles had been fitted incorrectly in the 1960s renovation, so this was also rectified.

The whole process was completed over a number of months, one roof pitch at a time, to reduce inconvenience and disturbance in the rooms below. The weather did not help, with long periods of cold and snow providing occasional delays. The final pitch was completed in February 2011, and the total cost for all work amounted to just over £22,500.



Installing sloping ceiling insulation between rafters after tiles removed

As each loft area was insulated, the family noticed that the house became considerably warmer. Heat produced in the house is now retained for longer, allowing them to reduce the time the boiler is running. They have also noticed that for the first time, snow no longer melts on the roof after falling due to the heat retention provided by the insulation.

They are very pleased with the completed work and look forward to the reduction in their fuel bills, as well as the rooms on the upper storey being a more comfortable temperature in both summer and winter.

Energy consumption	Total (kWh)	Per m ² floor area
Before improvement (2010)	101,222	362
After improvement (2011)	75,201	269
With all possible measures	31,602	113
UK average (2011)	19,800 ¹	217 ⁴

CO ₂ emissions	Total (tonnes)	Kg per m ² floor area
Before improvement (2010)	20.20	72
After improvement (2011)	15.60	56
With all possible measures	7.60	27
UK average (2011)	6.00 ²	66 ⁴

Running costs	Total	Per m ² floor area
Before improvement (2010)	£3,515	£12.59
After improvement (2011)	£2,813	£10.07
With all possible measures	£1,595	£5.71
UK average (2011)	£1,032 ³	£11.34 ⁴

¹Ofgem 2011

²English Housing Condition Survey 2011

³Ofgem 2011

⁴Based on 91m² from English Housing Condition Survey 2011