

# Traditional stone cottage Cotswolds

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connecting with local tradespeople

## Case study 14



£1,026

Saving  
on fuel bills

42%

Reduction  
in carbon  
emissions

Measures installed	Total cost	Annual CO <sub>2</sub> saving (tonnes)	Annual fuel bill saving
Internal wall insulation and sloping ceilings	£9,792	3.56	£859
Double and secondary glazing	£4,430	0.17	£65
Light fittings with LED bulbs	£791	0.36	£102
<b>Total package</b>	<b>£15,013</b>	<b>4.09</b>	<b>£1,026</b>

## The home

This Cotswold stone cottage was built in the early 1700s and lies within a conservation area. Covering three floors, the rear of the property is built into the hillside.

At the time of the Target 2050 survey it had 100mm of loft insulation and all the windows were single glazed.

Being off the mains gas network, the house was heated by oil-fired central heating and a wood burning stove. The owner had found that fuel use and costs were high and it could be difficult to maintain a comfortable temperature in the cold winter months.

## What they did

This was a home that required a range of bespoke solutions. Reducing heat loss was the highest priority. External wall insulation was clearly not appropriate as it would have a major impact on the external appearance of the house, so the owners looked at the options for internally insulating the walls of the rooms they used the most, and included the sloping ceilings in relevant rooms.

The next step was to find ways to improve the efficiency of the old single glazed windows, while retaining their historic character. This was achieved with a mix of bespoke double and secondary glazing units.

The third step was to fit low energy lighting.

“We are really pleased that the work we have carried out has not only helped us save energy but been in keeping with the distinctive character of our home.”



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**SevernWye**  
energy agency



**COTSWOLD**  
DISTRICT COUNCIL

## Internal wall insulation

Initially a quotation was received for a 10mm flexible thermal lining product, which for its thickness is a good insulator, and is generally effective at preventing condensation. However it does not achieve the insulation value of the thicker materials so alternative quotations were sought, including one from Opus Construction of Stroud. Their proposal was to use two different materials: a breathable insulation, Calsitherm climate board, on the ground floor where the walls are prone to damp as a result of being built into the hill and a lower cost, phenolic foam insulation on the first and second floors. Both products are 30mm thick. Lime plaster was used on the ground floor to maintain breathability. The cost for this was slightly lower than the flexible thermal lining for a much more effective insulation that also permits the ground floor walls to breathe.

Due to the disruption the work would involve, the family timed this project to coincide with them being away from the house for the week. The total cost for the insulation work was £9,800.

## Double and secondary glazing

Three original stone mullion windows on the ground and first floors were improved with new secondary double glazed units by Sliding Sash Windows Ltd for just under £3,000. These are timber framed and are designed so that they can be removed when required leaving only the outer surrounding frame. The side panels in the two triple windows are side hung and the centre panel top hung. This enables access to all of the existing windows, and retains the traditional appearance.

A further three windows in the bedrooms on the upper floors were entirely replaced with new double glazed units by Northleach Joinery for just over £1,000. Despite their traditional appearance these windows comply with current Building Regulations standards for energy efficiency, helped by a low emissivity coating on the glass.



*The newly insulated internal walls and secondary glazing, both of which were yet to be painted*

## LED lighting

Halogen lighting was used in several of the rooms, this could be changed for either compact fluorescent (CFL – standard energy saving bulbs) or LED bulbs. LEDs use about a tenth of the energy that is required by halogens so although they are expensive to buy they are far cheaper to run.

Changing to either kind of bulb meant that the light fittings also had to be changed, either to accommodate the physically bigger CFLs or the lower wattage LEDs. The cost of seven CFL bulbs and fittings was £147, while the cost of sixteen LED bulbs and fittings was £456. The labour cost to install all of the fittings and bulbs was £188, and the contractor was Duntisbourne Electrical.

Energy consumption	Total (kWh)	Per m <sup>2</sup> floor area
Before improvement (2007)	37,470	332
After improvement (2010)	20,555	182
With all possible measures	16,195	143
UK average (2011)	19,800 <sup>1</sup>	217 <sup>4</sup>

Running costs	Total	Per m <sup>2</sup> floor area
Before improvement (2007)	£2,502	£22.14
After improvement (2010)	£1,476	£13.06
With all possible measures	£1,238	£10.96
UK average (2011)	£1,032 <sup>3</sup>	£11.34 <sup>4</sup>

<sup>1</sup>Ofgem 2011

<sup>2</sup>English Housing Condition Survey 2011

CO <sub>2</sub> emissions	Total (tonnes)	Kg per m <sup>2</sup> floor area
Before improvement (2007)	9.84	87
After improvement (2010)	5.75	51
With all possible measures	4.24	38
UK average (2011)	6.00 <sup>2</sup>	66 <sup>4</sup>

Possible next steps	Annual CO <sub>2</sub> saving (tonnes)	Annual fuel bill saving
Insulation to solid concrete floors	0.35	£84
Replacement boiler	0.32	£73
Solar water heating	0.33	£74
Solar PV (1 kWp)	0.52	£93
Total	1.52	£324

<sup>3</sup>Ofgem 2011

<sup>4</sup>Based on 91m<sup>2</sup> from English Housing Condition Survey 2011