

Traditional stone cottage Painswick

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Case study 5



£2,194

Saving on fuel bills

59%

Reduction in carbon emissions

Measures installed	Total cost	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Sloping ceiling insulation	£3,659	2.21	£590
Internal solid wall insulation	£5,370	4.57	£1,224
Replacement LPG boiler and controls	£3,938	1.55	£380
Total package	£12,967	8.33	£2,194

The home

This traditional Cotswold stone cottage has many period features, including walls which are up to two foot thick in places, exposed beams and rooms in the roof with sloping ceilings and dormer windows.

There is a combination of steel and wood framed windows, mostly double glazed, and the flooring is mix of suspended timber and flagstone.

Accessible areas of loft were found to have less than 100mm of insulation, and with no mains gas to the property, the central heating was supplied by an LPG boiler. This was supplemented by a log burner in the living room and an LPG Aga for cooking.

What they did

The owners were finding it very expensive to heat the house, and it took a long time to warm up when they got home from work. Having lived in the property for two years, they were planning a substantial renovation and were keen to incorporate energy saving measures wherever possible.

Initially they thought this would involve installing "high tech" solutions, but the Target 2050 report persuaded them that simpler solutions such as insulation and heating improvements would make a significant difference.

"Target 2050 has changed our view of what it means to be green: there's so much more to it than solar panels! Having felt the benefits of insulation we've become real advocates for it."



asiantaeth ynni
SevernWye
energy agency



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Solid wall and sloping ceiling insulation

The first priority was to insulate the roof and walls. This had to be done internally, in order to preserve the appearance of the house. It was achieved by insulating all the external heat loss surfaces of the upper floor of the home, including all the sloping ceilings, dormers and walls with Thermaline Super 65. Although this is 65mm thick, the exposed beams are still visible and the installer took care to replicate the curved window reveals so as not to lose the period character of the home. The cost for the upper floor was £5,394. The householders found the insulation so effective that they then decided to insulate the majority of the walls on the ground floor as well at a cost of £3,635. The overall effect is a much warmer and more comfortable home, without any loss of historic features, and a good example of sensitive sustainable renovation.

Wood fuel options

The householders wanted to change from LPG heating to something more sustainable and considered a boiler fuelled by wood pellets. Two options were considered, either of which could have been connected to their existing radiators. The cheaper option would have required wood pellets to be manually loaded from 2kg bags. The current owners would have been happy with this arrangement, but they were worried that a heating system that involved manual handling of fuel might put off potential buyers, if they ever came to sell the house.

On further investigation they discovered that the second option, a system with the pellets automatically fed to the boiler, was considerably more expensive, and in this case more than twice the price.

Replacement LPG boiler

In the end they decided to install a replacement LPG boiler, so that the modern convenience of a fully automated system would be available to any future occupants. In practice, they rarely use it themselves, as they also have the wood burning stove which they find adequate most of the time.



Insulated walls finished in keeping with character of the cottage

The cost of the replacement boiler was quite high at £3,938 because of additional works required, including removal of the old hot water tank, replacement of a corroded gas pipe and burying some of the pipe work in a wall.

They also took the opportunity to upgrade the heating controls to include thermostatic radiator valves that can be controlled wirelessly by the central heating programmer. This effectively means that a separate heating programme can be set for each room.

This case study is a good example of the effective practical compromises that can be made to improve energy efficiency in an older building.

Energy consumption	Total (kWh)	Per m ² floor area
Before improvement (2007)	60,000	393
After improvement (2010)	20,679	135
With all possible measures	13,679	90
UK average (2011)	19,800 ¹	217 ⁴

Running costs	Total	Per m ² floor area
Before improvement (2007)	£3,049	£19.95
After improvement	£855	£5.59
With all possible measures	£425	£2.78
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 (2007)	14.21	93
After improvement (2010)	5.88	38
With all possible measures	3.99	26
UK average (2011)	6.00 ²	66 ⁴

Possible next steps	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Solar PV (1 kWp)	0.33	£138
Solar hot water	0.33	£35
Total	0.66	£173

³Ofgem 2011

⁴Based on 91m² from English Housing Condition Survey 2011