Georgian town house Stonehouse

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Case study 12

£656 Saving on fuel bills

37% Reduction in carbon emissions

Measures installed	Total cost	Annual CO_2 saving (tonnes)	Annual fuel bill saving
Internal solid wall insulation	£4,500	2.34	£327
Secondary glazing	£6,260	0.36	£52
Replacement combi boiler	£2,350	0.74	£93
Solar PV (2.2 kWp)	£8,391	1.03	£184
Total package	£21,501	4.47	£656
Plus income from PV Feed-In Tariff (FIT)			£743

The home

This Grade II listed, Georgian, semi-detached house was built around 1830 with 9" thick solid walls constructed from the local Stonehouse brick.

Other period features include attic rooms, with sloping ceilings, and original single glazed sash windows.

Originally there would have been a suspended timber floor but prior to the current ownership this had been replaced with a solid concrete floor.

When this property was purchased as a family home in 2005 it had no insulation, rotting sash windows, an old gas combi boiler and an unsafe gas fire. It was hot in the summer and impossible to keep warm during the winter with rattling windows letting in the draughts.

What they did

Immediate action was taken to repair and draughtproof the windows. The household also began to address the insulation, with a grant from Stroud District Council towards insulating the sloping ceilings of the attic rooms and internal wall insulation to the living room and dining room. A key factor in the decision to insulate the walls was the poor condition of the plasterwork. The insulation gave them flat and stable surfaces to decorate over.

This was followed by secondary glazing to the windows, a replacement gas boiler, and photovoltaic panels to generate electricity.

£743 Income from Feed-In Tariff (FIT)

"Our home was very cold and draughty when we moved in but now it's warmer and much more comfortable, yet we are spending a good deal less on energy."

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Internal wall insulation

In Autumn 2007 the family applied to take part in the Target 2050 exemplar homes programme, which enabled them to install a complete range of energy saving measures. The first step was to finish the insulation of the building by lining all of the remaining external walls with insulation-backed plasterboard. The insulation material is 60mm phenolic foam which adds a total thickness of 80mm to the existing walls. The total cost was £6,300 for all external walls, which was mitigated by the householder doing all of the preparatory work, such as removing radiators and sockets, and redecorating afterwards.

Secondary glazing

Having addressed the main areas of heat loss – the walls and roof – attention then returned to the windows. Secondary glazing was added to all the windows at the front of the house, which had to be custom made to ensure a perfect fit. The units installed were double glazed, meaning that the windows are now, in effect, triple glazed. This not only reduces heat loss and draughts but also provides sound insulation, which is particularly beneficial for a house on a main road.

Professional installation for the eight windows at the front of the house cost £5,500 so the owners decided to economise by installing secondary glazing at the rear of the house as a DIY project, at a cost of £1,500. Even with single glazed units secondary glazing can have a profound effect on comfort.

Heating improvements

The next step was to install a high efficiency gas combi boiler, designed to take a hot water feed from solar panels, should these be fitted in the future. As it is a listed building the panels could only be installed on the rear, west facing roof but this is not the ideal orientation. There is no obvious place to put a hot water storage tank but given that a boiler can last 15 years or longer, the family did not want to rule out the option of solar water heating in future.

Double glazed secondary glazing to sash windows

Solar electricity

Having planned for solar panels for hot water, the family decided instead to use the space on the roof at the back of the house for solar photovoltaic panels. This is a more straightforward installation than the solar water heating and will generate an income via the Feed-In Tariff for home generated electricity.

Next steps

The family would like to install solar hot water, but they first need to decide where to locate the hot water cylinder.

Energy consumption	Total (kWh)	Per m² floor area
Before improvement (2007)	60,400	344
After improvement (2010)	38,098	217
With all possible measures	35,598	203
UK average (2011)	19,800[1]	217[4]

CO_2 emissions	Total (tonnes)	Kg per m² floor area
Before improvement (2007)	12.07	69
After improvement (2010)	7.60	43
With all possible measures	7.11	40
UK average (2011)	6.00[2]	66[4]

Running costs	Total	Per m² floor area
Before improvement (2007)	£1,989	£11.32
After improvement (2010) - excl FIT income	£1,333	£7.59
With all possible measures	£1,269	£7.22
UK average (2011)	£1,032[3]	£11.34[4]

Possible next steps	Annual CO_2 saving (tonnes)	Annual fuel bill saving
Insulation to solid concrete floors	0.24	£33
Solar water heating	0.25	£31
Total	0.49	£64

[1] Ofgem 2011
[2] English Housing Condition Survey 2011
[3] Ofgem 2011
[4] Based on 91m² from English Housing Condition Survey 2011

Energy performance and carbon emissions in the Target 2050 exemplar homes have been modelled using the UK Standard Assessment Procedure (SAP). The savings data presented here is based on a standard occupancy pattern. This may not reflect actual usage by the building's current residents but is used to compare homes of different sizes and types in a way that assesses the building itself rather than the behaviour of any particular occupant.