

1900s mid terrace house Gloucester

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Case study 15



£372

Saving on fuel bills

35%

Reduction in carbon emissions

Measures installed	Total cost	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Internal solid wall insulation and sloping ceiling	£2,200	0.99	£110
Double glazing	£420	0.05	£8
Solar PV (2.88 kWp)	£11,409	1.42	£254
Total package	£14,029	2.46	£372
Plus income from PV Feed-In Tariff (FIT)			£1,076

The home

This is a mid-terrace house built around 1900. In 2005 it was purchased as a family home by the current owners, who have refurbished the property extensively and extended it to the rear.

They have gas central heating, with an efficient condensing boiler, but since moving in during 2006, the family have found the rooms in the original part of the house quite difficult to keep warm and they were keen to look at options to improve this.

They also wanted to consider the possibility of generating some of their own energy.

What they did

One of the priority recommendations from Target 2050 was to consider insulating some of the exposed solid brick walls in the original part of the house, and the walls and sloping ceiling of the back bedroom. The family were well aware that they were losing a lot of heat through these areas and the back bedroom was little used as a result.

The next step was to double glaze the big living room window. Finally, the owners installed solar photovoltaic panels, and are now generating their own electricity.

"Our last bedroom has until now been a room to freeze in. After the works however, the kids are currently throwing dice to decide who moves in there."

£1,076 Income from Feed-In Tariff (FIT)



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Internal wall insulation

The first step was to work out how best to insulate the walls. External wall insulation was considered at first, but as the house fronts straight onto the pavement the advice from the Planning Department of Gloucester City Council indicated that it would be unlikely to receive planning permission. The alternative was to insulate the walls internally. Although this is the more disruptive method and took some consideration, the family decided that the long term benefits made it worthwhile to insulate the bedrooms, but not the front living room which had not long been redecorated. This also combined well with internally insulating the sloping ceilings of the rear bedroom and on the plus side, the householders felt it would give them a push to start another phase of redecorating.

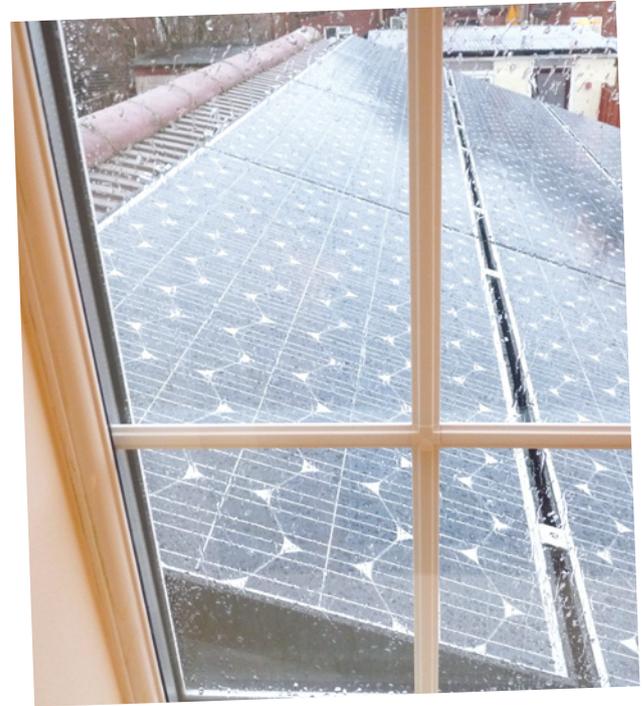
A building contractor was recommended by a neighbour. Although he had never been asked specifically for internal insulation before, the method is very similar to standard drylining so once a specification was agreed, there was no problem with carrying out the work. All of the existing plaster was removed and a timber studwork frame fixed to the wall. A phenolic foam insulation bonded to standard gauge plasterboard was fixed to the framework and the new wall received a plaster skim and new skirting boards to finish. The rooms that have been insulated have now been redecorated and are noticeably warmer.

Double glazing

The second improvement the family made was to replace the only remaining single glazed window in their home with a double glazed one. Again this was a significant boost to comfort as the window is in their main living room.

Solar electricity

With all energy conservation measures complete, the family turned their thoughts to installing a renewable energy system. The rear roof of the house faces south east, which is near the optimum orientation for solar panels. A solar thermal



PV system installed on the roof of the extension

system was decided against as they have recently installed a condensing combi boiler, which could be converted for use with solar panels but would have required a hot water cylinder for which there was no space available.

A solar photovoltaic (PV) system became a financially, as well as environmentally, attractive solution with the introduction of the Feed-In Tariff (FIT) incentive payment for electricity from renewable sources. Several installers were contacted for quotes and in January 2011 Horizon Renewable Energy Systems installed a 2.88kWp hybrid system which has a predicted annual yield of 2,400 kWh.

Energy consumption	Total (kWh)	Per m ² floor area
Before improvement (2007)	30,928	263
After improvement (2010)	23,905	203
With all possible measures	13,659	116
UK average (2011)	19,800 ¹	217 ⁴

Running costs	Total	Per m ² floor area
Before improvement (2007)	£1,537	£13.06
After improvement (2010) - excl FIT income	£1,165	£9.90
With all possible measures	£823	£6.99
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)	6.96	59
After improvement (2010)	4.50	38
With all possible measures	2.53	21
UK average (2011)	6.00 ²	66 ⁴

Possible next steps	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Internal wall insulation to front of house	0.45	£78

³Ofgem 2011

⁴Based on 91m² from English Housing Condition Survey 2011