1900s semi-detached Gloucester

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Case study 17

£699 Saving on fuel bills

40% Reduction in carbon emissions

Measures installed	Total cost	Annual CO_2 saving (tonnes)	Annual fuel bill saving
External solid wall insulation	£18,506	2.27	£475
Loft insulation top-up	£49	0.15	£32
Sloping ceiling insulation	£2,156	0.44	£91
Double and secondary glazing	£8,716	0.36	£69
Hot water cylinder insulation jacket	£9	0.20	£32
Total package	£29,436	3.42	£699

The home

This semi-detached house was built around 1900. All the walls are solid brick and since the large gable end wall faces north, this is a major heat loss area.

There are three floors, with the top floor being "rooms in the roof" with sloping ceilings, and small adjoining loft spaces without insulation.

The windows were all single glazed at the time of the survey, and many original ones remained. The ground floor is solid throughout the property, except for the front room which has a suspended timber floor. Central heating is provided by a mains gas boiler with a hot water storage cylinder.

What they did

The Target 2050 home energy survey identified that the measure which would achieve the greatest carbon and cost savings was insulating the solid walls. External wall insulation with a brick slip finish preserved the appearance of the house, and was extended to include the house next door, where the owners had also applied to join Target 2050.

A mix of secondary and double glazing also achieved improved warmth without loss of character.

Attention turned next to the roof, and a pragmatic approach to insulating the attic room included insulation of both horizontal and vertical heat loss areas, work which was carried out by the householders themselves.

They continued their DIY work by installing draught-proofing and fitting radiator panels to reflect heat back into the room. They also reviewed the lighting and fitted low energy light bulbs.

"Using the brick slips has meant our newly-insulated home looks just like all the others in the street but is much warmer."

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External wall insulation

The property is not in a conservation area, but the street is entirely made up of brick built period properties and the owners were keen not to change the external appearance of their home. External insulation with a render finish would therefore not have been acceptable, and would have meant applying for planning permission. Internal insulation was another option, but was considered too disruptive. The owners decided that the best solution was to have external wall insulation with a "brick slip" finish, where the basecoat render is effectively tiled with thin slices of real or mock brick. This increased the cost of the work considerably, partly because of the cost of the brick slips but mainly due to the considerable amount of time required to apply them and point in between them.

The owners of the adjoining property were also keen to undertake external wall insulation. Insulating both properties makes it less noticeable that either has been insulated, as the finish is continuous across both, and the depth of the insulation is less apparent as, for example, the window reveals would remain the same depth on both properties. BCL Insulation of Cheltenham were engaged to insulate both properties with the brick slip finish, which has now been completed. The houses look tidier but still in keeping with the rest of the street. The insulation installed was 80mm EPS (expanded polystyrene).

Brick slip being applied to insulated walls

Insulating the attic rooms

The rooms at the top of the house were uncomfortably cold in winter and tended to overheat in summer. This was remedied by the installation of sloping ceiling insulation and already the family have noticed that the rooms are more comfortable. This has been complemented by the householders installing insulation behind the stud walls that close the eaves perimeter and in the small loft space behind, so preventing heat loss both through the walls forming the attic room and through the ceiling from the rooms below. The result is to make the attic room more comfortable, as well as reducing heat loss from the rest of the house through the roof.

UK average (2011)	19,800[1]	217[4]

Double and secondary glazing

The householders also wished to reduce heat loss from the windows and those at the side and rear of the property were replaced with double glazing. They wanted to keep the original wooden sash windows at the front, so secondary glazing was made for these. This achieves the same level of improvement as double glazing and the reduction in draughts and noise has been noticeable already.

Other low cost measures they have undertaken themselves include hot water tank insulation, fitting reflective panels behind radiators, draught proofing and installing low energy light bulbs.

Energy consumption	Total (kWh)	Per m² floor area
Before improvement (2007)	44,426	302
After improvement (2010)	22,777	155
With all possible measures	16,335	111
UK average (2011)	19,800[1]	217[4]

CO_2 emissions	Total (tonnes)	Kg per m² floor area
Before improvement (2007)	8.61	59
After improvement (2010)	5.19	35
With all possible measures	3.87	26
UK average (2011)	6.00[2]	66[4]

Running costs	Total	Per m² floor area
Before improvement (2007)	£2,052	£13.96
After improvement (2010)	£1,353	£9.20
With all possible measures	£1,325	£9.01
UK average (2011)	£1,032[3]	£11.34[4]

Possible next steps	Annual CO_2 saving (tonnes)	Annual fuel bill saving
Solar hot water	0.27	£42
Solar PV (1 kWp)	0.52	£93
Total	0.79	£135

[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.