1900s semi-detached Gloucester

This and many other case studies are also available online at **www.linktoenergy.org.uk**

link to energy
connecting with local tradespeople

Case study 18

£391 Saving on fuel bills

38% Reduction in carbon emissions

Measures installed	Total cost	Annual CO_2 saving (tonnes)	Annual fuel bill saving
External solid wall insulation	£7,680	0.40	£261
Solar PV (1.72 kWp)	£8,692	0.73	£130
Total package	£16,372	1.13	£391
Plus income from PV Feed-In Tariff (FIT)			£451

The home

This is a Victorian semi-detached house built around 1900. The original house has solid brick walls, but there is a single storey extension at the rear, with no insulation in its cavity walls.

Some thermal improvements had already been made at the time of the survey to some areas of internal wall insulation at first floor level at the front of the house, and to sloping ceilings. The loft had been insulated to a depth of 250mm and the house is fully double glazed.

The house is heated using a combination of a wood burning stove in the main living area and two electric panel heaters in the main bedrooms.

Hot water is provided by a gas multi point system.

What they did

The family felt that the heat being produced by the stove and heaters was not being retained effectively by the house, and that this was due in particular to the inadequate wall insulation. They were therefore keen to look at ways of improving this, and at the possibility of generating some of their own energy.

The Target 2050 report helped them to confirm that their next steps would be to improve the wall insulation and to install solar photovoltaic panels to generate their own electricity.

£451 Income from Feed-In Tariff (FIT)

"The insulation was finished in March so we'll have to wait until next winter to really feel the benefits, but there have been indications that the temperature is higher and more stable."

asiantaeth ynni SevernWye energy agency

GLOUCESTER CITY COUNCIL

External wall insulation

The householders' highest priority was improving the insulation. Further internal insulation was ruled out because they wanted to keep the period features inside their home, having already done what was most feasible. External insulation can in any case be the ideal solution where this is acceptable in terms of the external appearance of the building, as by enveloping the building, it ensures that the whole structure is kept warm.

A decision was made, towards the end of 2010, to externally insulate the side gable and rear walls of the home, and this was carried out by Domestic and General Insulation Ltd, a Worcester/Hereford based company active in Gloucestershire. The front elevation was not included because it would have changed the appearance of the home, the owners did not want this and it would also have required planning permission. Some of the walls to the front had already been insulated internally, leaving just the front wall of the living room, which is largely covered by the bay window.

The insulation work involved cutting and fitting 50mm thick slabs of solid foam insulation to the entire wall areas and covering over this with a reinforcing mesh bound together with layers of render. The work was delayed due to bad weather as the render will not set if it is too cold or too wet, but work progressed quickly once it was possible to start again.

The final coat of render being applied to insulated side wall

Solar electricity

Electricity demand in this home is slightly higher than average, as electricity is used for some of the space heating, as well as lights, appliances and cooking. This meant that solar photovoltaic (PV) panels for generating electricity were a particularly appropriate next step. This had been made more feasible by the introduction of the Feed-In Tariff, which ensures a good return on investment in home generation of this kind, with a guaranteed tariff for 25 years providing payments to the household by the electricity supplier for electricity generated.

Green Solar Solutions from Malmesbury installed a 1.72 kWp photovoltaic system in December 2010. This is expected to generate over 1,000 kWh per year.

Next steps

The family are also considering a loft conversion and possibly a rear extension, both of which would be designed to maximise energy efficiency through high specification glazing, plenty of insulation and sustainable materials. The extension would probably make use of under floor heating, which is more efficient than radiators as it runs at a lower temperature. There is also the possibility of installing a further array of solar panels on the south west facing rear roof.

Energy consumption	Total (kWh)	Per m^2 floor area
Before improvement (2007)	26,570	369
After improvement (2010)	17,599	244
With all possible measures	14,442	200
UK average (2011)	19,800[1]	217[4]

CO_2 emissions	Total (tonnes)	Kg per m^2 floor area
Before improvement (2007)	3.01	42
After improvement (2010)	1.88	26
With all possible measures	1.69	23
UK average (2011)	6.00[2]	66[4]

Running costs	Total	Per m^2 floor area
Before improvement (2007)	£1,273	£17.66
After improvement (2010) - excl FIT income	£882	£12.23
With all possible measures	£770	£10.68
UK average (2011)	£1,032[3]	£11.34[4]

Possible next steps	Annual CO_2 saving (tonnes)	Annual fuel bill saving
Flat roof insulation	0.07	£47

[1] Ofgem 2011
[2] English Housing Condition Survey 2011
[3] Ofgem 2011
[4] Based on 91m^2 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.