An extended 1970s house
South Gloucestershire

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Case study 29

£574 Saving on fuel bills

45% Reduction in carbon emissions

Measures installed	Total cost	Annual CO_2 saving (tonnes)	Annual fuel bill saving
Loft insulation top-up	£199	0.10	£18
Cavity wall insulation	£199	1.20	£211
Floor insulation	£6,132	0.47	£81
Replacement boiler and controls	£5,313	1.37	£234
Log burner	£2,584	0.33	£30
Total package	£14,427	3.50	£574

The home

This has been a family home for the last five years. The house was built in the 1970s and was extended during the 1990s. Since moving in, the family had found it difficult to heat their home to a comfortable temperature. The aged gas back boiler seemed to be struggling to heat the house and this was exacerbated by radiators that never got very hot. Plug-in electric heaters were used to compensate for this, meaning that the household found both their gas and electricity bills were high.

What they did

The Target 2050 home energy report identified significant savings from replacing the boiler, but also highlighted the need for basic insulation measures to be carried out. The householders followed this advice and had both cavity wall and loft insulation installed in the summer of 2010.

The family had always found the ground floor of the house cold underfoot, which was not ideal for their young children. The carpets were laid over a solid concrete floor with just a thin underlay. A decision was therefore taken to insulate the entire ground floor area in order to make it more comfortable.

With insulation improvements complete, attention could then turn to the recommended heating upgrades. The old, inefficient boiler was replaced with a new 'A' rated condensing boiler, along with new radiators and heating controls. The original gas fire in the living room was also removed, and in its place a modern, stylish wood burning stove was fitted.

"I consider the improvements that we have made as an investment in the house, as well as making our home far more comfortable."

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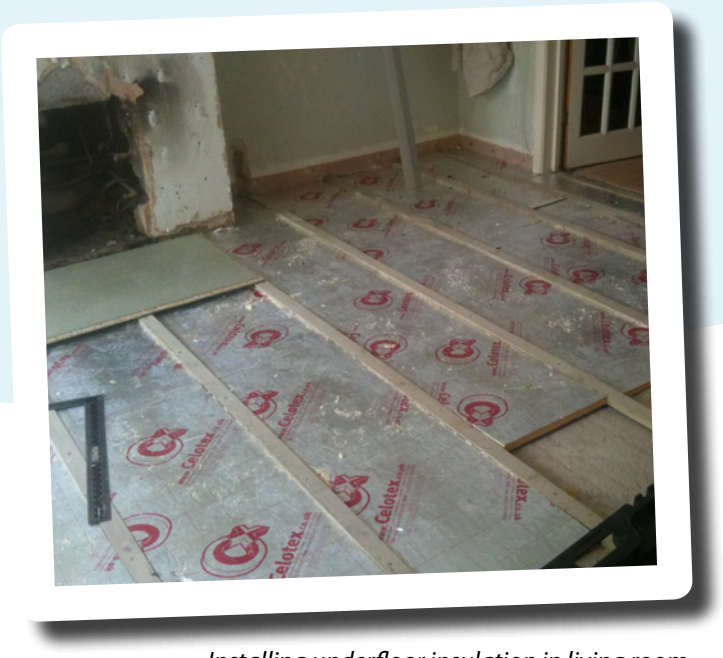
South Gloucestershire Council

Insulation improvements

Cavity wall insulation was completed utilising a partial grant available from the Gloucestershire Warm and Well scheme. They also took advantage of an offer on rolls of loft insulation at a local DIY store and topped up the lofts in the original house and the extension to the recommended depth of 270mm. The family have particularly noticed the improvement in comfort from increasing the loft insulation above the extension. Draught proofing was applied to the loft hatches and some of the older windows, which has also noticeably improved comfort in the home.

In autumn 2010 the second and main stage of the home improvements began. A contractor was employed who completed the floor insulation in several stages. Furniture had to be moved, and areas of concrete floor dug out to provide an even floor surface to insulate. Wooden battens were fixed to the floor and phenolic foam insulation was fitted in between, before boarding over and completing with a new bamboo floor covering.

Inevitably, this work was to prove quite disruptive, though it did provide the householders with the opportunity to complete other jobs that could be done whilst the floor was up. This included updating and improving some electrical wiring, moving the gas and electricity meters, re-decorating, and installing new central heating pipe work in preparation for their new condensing gas boiler. On completion the family noticed the improvement in comfort and warmth on the floor, and it is now somewhere that the children can sit and play.



Installing underfloor insulation in living room

Heating improvements

Attention was then focused on improving the heating systems in the house. With the new pipe work installed, a gas condensing boiler went in, along with space-saving vertically mounted radiators downstairs and small efficient radiators in the bedrooms upstairs. The system is controlled with a programmable room thermostat and thermostatic radiator valves, which enable independent temperature adjustment in each room.

The householders also looked at options for replacing the old gas fire that didn't provide adequate heat for the large open plan living area downstairs. They were keen to accommodate a renewable resource, so investigated several different wood burning stoves. Devon Fires were contracted to complete the work and the householders chose a stylish and efficient 5kW Bullerjan Stove with a glass floor plate. During the cold winter weather, the family have found that it burns their locally sourced logs very efficiently, and easily provides enough heat for the living area downstairs which is commonly used as a home office during the day.

Energy consumption	Total (kWh)	Per m² floor area
Before improvement (2010)	35,331	332
After improvement (2011)	18,241	172
With all possible measures	15,333	144
UK average (2011)	19,800[1]	217[4]

CO_2 emissions	Total (tonnes)	Kg per m² floor area
Before improvement (2010)	7.76	73
After improvement (2011)	4.26	40
With all possible measures	3.42	32
UK average (2011)	6.00[2]	66[4]

Running costs	Total	Per m² floor area
Before improvement (2010)	£1,662	£15.63
After improvement (2011)	£1,088	£10.24
With all possible measures	£944	£8.88
UK average (2011)	£1,032[3]	£11.34[4]

Possible next steps	Annual CO_2 saving (tonnes)	Annual fuel bill saving
Solar PV 1kWp	0.45	£40

[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.