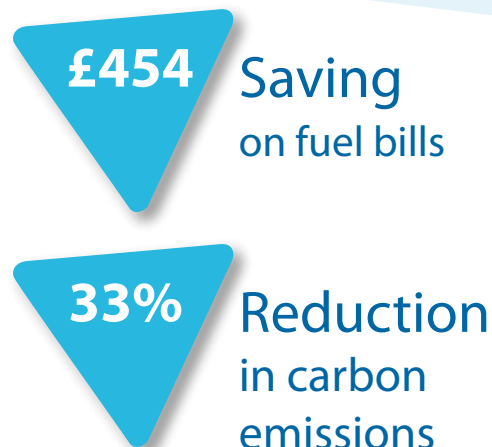


1970s maisonette South Gloucestershire

This and many other case studies are also available online at www.target2050.org.uk

Case study 19



Measures installed	Total cost	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Cavity wall insulation	£199	0.21	£65
Flat roof insulation	£2,995	0.83	£257
Air to Air heat pump	£2,232	0.42	£132
Total package	£5,426	1.46	£454

The home

This early 1970s mid-terrace maisonette had no heating system at all when the current owners moved in in 2007. They installed electric panel heaters, a quick and easy installation, but have found this an expensive way to heat their home.

More recently the flat roof began to leak, creating damp and adding uncomfortably to the speed at which the home lost heat. Repairing this provided the ideal opportunity to insulate at the same time, and this was carried out with assistance from South Gloucestershire Council.

What they did

It was estimated that, once completed, the flat roof insulation could save the family over £250 a year on their electricity bill. The other main heat loss area for this home, the cavity

walls, had not been insulated yet, so this became the next priority. As there were no breaks in the cavity between the walls of the maisonette, the flat underneath and the maisonette next door, all three properties had to be insulated at the same time.

Attention then turned to the heating system itself, and the decision was made to install an air to air heat pump, identified as a suitable choice by their Target 2050 energy adviser. The system chosen has two outlets indoors, one downstairs and one upstairs, to distribute the heat at both levels. As an all electric home, the reduction in electricity bills is significant and is the main focus.

Lighting improvements are next on the agenda.

“We are all feeling the benefits from the insulation and heat pump. Especially my young son who no longer gets up in the morning complaining that he is cold.”



SevernWye
ENERGY AGENCY



Flat roof insulation

The main area of heat loss was through the flat roof of the maisonette. As this had developed a leak it gave the opportunity of installing insulation at the same time as replacing the roof covering. The family have already felt the difference from this insulation.

Cavity wall insulation

The Gloucestershire Warm and Well scheme, managed by Severn Wye Energy Agency on behalf of a group of seven local authorities, offers discounted cavity wall insulation to all home owners, so all three households were approached and the walls were insulated as one job. Small, tile hung areas of wall beneath the windows of the maisonettes at the rear could not be insulated because they are not of cavity construction. This could be addressed at a later stage using either internal or external insulation methods but in the meantime, the majority of the wall area has been insulated.

Air to air heat pump

The main heat source for the home was electric panel heaters which run on peak rate electricity; these are expensive to run, especially in a poorly insulated home. The Target 2050 report suggested replacing this with an air-to-air heat pump system, providing an efficient and cost effective alternative.

Two air source heat pump installers were contacted and three different systems were proposed, with either one or two inlet points mounted outside, and up to four outlets inside.

As each system delivered approximately the same amount of heat, and both floors of the property are relatively open plan, only two units were considered necessary on the inside. The simplest two-outlet system only has one inlet, which makes installation cheaper and reduces the visual impact. Gregor Heating and Renewable Energy from Bristol installed a Vaillant 6.4kW system at a cost of around £2,200.

The system comprises one external unit housing an evaporator coil which absorbs heat from the air, mounted



The air source heat pump system is operated with a remote control – seen in a wall mounted cradle.

on wall brackets above the porch. This links to a refrigerant circuit and heat exchanger that transfers the heat to the two indoor units that distribute the warm air using fans.

One is above the door to the entrance stairwell which heats the lounge and kitchen areas. The second unit is high up on the wall at the top of the stairs on the first floor and provides heat to the bedrooms. The heat pump is operated with remote controls which allow the family to set each unit independently, providing thermostatically controlled heat.

The householders are so pleased, that they have recommended the system to friends. It is estimated the family could save around £130 a year from their electricity bill.

Future plans

Future plans include replacing all light bulbs with low energy versions. The halogen bulbs in the kitchen could be replaced with low energy halogens that use 30% less energy. Alternatively, installing LEDs in the kitchen could save them a massive 90% of the energy used for their kitchen lighting.

Energy consumption	Total (kWh)	Per m ² floor area
Before improvement (2007)	10,453	162
After improvement (2010)	6,988	108
With all possible measures	4,307	67
UK average (2010)	19,800 ¹	243 ⁴

Running costs	Total	Per m ² floor area
Before improvement (2007)	£1,204	£18.67
After improvement (2010)	£750	£11.63
With all possible measures	£530	£8.22
UK average (2010)	£1,032 ³	£12.15 ⁴

¹ Energy Saving Trust, 2010

² English House Condition Survey, 2007 (private sector housing only)

CO ₂ emissions	Total (tonnes)	Kg per m ² floor area
Before improvement (2007)	4.41	68
After improvement (2010)	2.95	46
With all possible measures	1.68	26
UK average (2010)	7.10 ²	72 ⁴

Possible next steps	Annual CO ₂ saving (tonnes)	Annual fuel bill saving
Low energy light bulbs	0.05	£11
Hot water cylinder insulation	0.15	£10
Solar water heating	0.49	£80
Solar PV	0.53	£103
Total	1.27	£220

³ U Switch, March 2010

⁴ Based on 98m² from English House Condition Survey, 2007 (private sector housing only)