51 Gardener St, Brighton BN41 1SX

OVERVIEW

Type: Mid terrace

Age: Victorian

Beds: 2

Walls: Solid rendered

Area: 75 m²

Residents: 2 adults, 1 child

FEATURES

+ Condensing boiler
+ Double glazing
+ Flue gas heat recovery
+ Heating controls, room thermostat and TRVs
+ LED lighting
+ Loft insulation
+ Solid wall insulation (External, front and rear)

Introduction and approach

Erin, Katie and their baby share this hard to heat Victorian terraced house. Because of the baby, temperatures have been kept high, making heating costly. Also Erin comes from California and still finds the UK chilly.

The recent Green Deal assessment revealed that although the house had part double glazing, in other respects it was very inefficient in its use of energy.

This has now been remedied, with initial work focussing on the basics, such as upgrading loft insulation to 300mm, installing an efficient condensing boiler with flue gas heat recovery and LED lighting. Equally importantly, programmable heating controls, TRVs and room thermostat have been fitted to allow heating to be fine tuned to their needs. Beyond that, the scheme has gone on to tackle the more demanding, but highly effective, insulation of the walls from the outside, both front and rear.

The end result has transformed an inefficient leaky house into a far more comfortable dwelling, with much reduced heating bills.

Energy and CO_2 performance

As the work has only recently been completed, it is not yet possible to measure the impact of energy saving measures on consumption and CO_2 emissions. However it is estimated that these should be around 50 % lower than a typical UK dwelling. If internal temperatures could be maintained at a slightly lower level, savings could be even greater.

Energy efficiency measures

Heating and hot water

The old inefficient boiler has been replaced by an Alpha Intec GS condensing boiler, with integral flue gas heat recovery (FGHR). Normal condensing boilers recover waste heat by condensing water vapour in flue gases, but this boiler goes one step further by extracting even more heat from flue gases using a heat exchanger coil. This preheated water feeds the combi and reduces hot water energy use, increasing overall efficiency by 5–10%.

Previously the heating for this house lacked basic controls, but it now has a programmer, roomstat and thermostatic radiator valves (TRVs). Just by having proper controls, the system's efficiency is greatly improved and less energy wasted.

Insulation

Loft insulation has been topped up to a full 300mm of mineral wool, sharply cutting roof losses.

Probably the biggest impact from this refurbishment comes from the installation of external solid wall insulation, using the Wetherby system, front and rear, using 100mm Kingspan Kooltherm phenolic foam. Solid batts of foam were fixed to the wall, covering the entire surface, using wide-headed plastic anchor bolts. This was then rendered with a thin coat of resin based compound, into which was bedded a tough woven mesh. This was finished with a self-coloured coat of render, to both weatherproof and decorate the surface. Within window reveals a thinner, 20mm layer of insulation was used, so as not to encroach on the glazed area. This highly efficient insulation has reduced the wall u value from 2.2 W/m²K to 0.20; a 90% reduction in wall heat loss. As a result, this measure alone should cut heating bills by one third. There were some architectural details, including key stones and a band above the door, which have been recreated using the Sytex system.

Because this is a terraced house, the insulation steps out from the surface and stops at the party

wall boundary on either side. Agreement was reached with adjacent neighbours in advance, regarding this alteration to the appearance.

The building was already largely double glazed and the owners have now made it entirely so by replacing the final few windows at the rear.

Electricity

New low energy LED lighting has been installed, cutting the lighting load to 10–20% of old, inefficient halogen lamps.

Lessons learned/ further improvements

The new digital room thermostat is proving a little difficult to come to terms with, but the aim is to keep temperatures around 20°C. This is a simple measure, but is important as each degree the heating is raised increases heat use by about 10%.

Care was needed at the property boundaries, to ensure that the insulation overlapped the party wall, to avoid cold spots caused by thermal bridging. Originally it stopped short and the installers had to extend it to overlap properly. Equally importantly, this kind of detailing needs to be agreed with neighbouring properties in advance

Some costs of the energy efficiency measures

Please note that these do not include a Green Deal Assessment or project management of the works

External solid wall insulation	£7,340
Re-instate architectural details on front	£197
Insulation between joists (main loft) upgrade from 100mm to 300mm	£2,025
Install condensing boiler with flue gas heat recovery	£2,275
Heating controls: programmer, room thermostat & TRVs	£527
Replace halogens with LEDs	£207
Draught proof external doors	£687
Total	**£13,258**

Professional team

on behalf of The Green Building Partnership

Project Management
Earthwise Construction:
www.earthwiseconstruction.org

Contract Management
The Green Building Partnership:
www.greenbuildingpartnership.co.uk

Design
Cityzen: www.cityzendesign.co.uk

Solid wall insulation
Beaumont Facades:
www.beaumontfacades.co.uk

Carpentry
Minton Young:
www.mintonyoung.com

Electrics & plumbing
Woodmans: www.woodmans.net

Materials

Wetherby insulation system:
www.wbs-ltd.co.uk

Insulation board:
Kingspan Kooltherm Phenolic
www.kingspaninsulation.co.uk

Architectural mouldings:
www.sytexuk.co.uk

Boiler: Alpha gas saver boiler range, with flue gas heat recovery
www.alpha-innovation.co.uk/products/GasSaver

This house was renovated as part of the Green Deal Pioneering Places project delivered by Brighton & Hove City Council, Brighton & Hove 10:10, The Green Building Partnership and Low Carbon Trust. The project was funded by the Department of Energy & Climate Change through the Local Authority Fund

Eco Open Houses is an annual collaborative project between Low Carbon Trust, Brighton Permaculture Trust and Brighton & Hove City Council. This year the event is run as part of the ECOFab 2 project and has been selected within the scope of the INTERREG IV A France (Channel): England cross-border European cooperation programme and is co-financed by the ERDF. The Green Deal strand of the project has been funded by the Department of Energy and Climate Change through the Local Authority Fund